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REDUCTION OF RADIATION EXPOSURE IN DIAGNOSTIC EXAMINATIONS.

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As a potentially noxious agent with delayed and cumulative effects is administered to the patient in X-ray examinations, it is incumbent on the radiologist to reassess constantly his methods as technology advances, in order to minimize the hazard to the patient. This recommendation is made specifically in the Report to the Prime Minister by the National Radiation Advisory Committee, July, 1958. This problem may be approached with the following considerations: (i) increased clinico-radiological consultation; (ii) restriction of irradiation to the region from which information is required, with masking of vulnerable tissues; (iii) examination techniques to minimize effective radiation and number of exposures.

Clinico-Radiological Consultation.

The diagnosis of any pathological state in a patient is dependent on the individual ability of the clinician; and if the patient is referred for opinion by a radiologist, it is again a function of individual ability. The field of reference may, of course, be further extended if a diagnostic problem is not solved at this stage, but in general, consultation between the two clarifies and narrows the problem for both. Unwarranted examination is best decided and eliminated at this stage, and the number and frequency of examinations are best minimized by such consultation.

Inquiry from the patient on the nature and extent of previous X-ray examinations and treatments should be obligatory as a preliminary to any exposure, to allow consideration of further irradiation. To facilitate this, a personal record should be kept of any exposure to the patient in private practice, as well as at hospital departments, as is now becoming routine. Exposures can be calculated by reference to tables showing dosages received by the skin, testis and ovary (Lincoln and Gupton, 1958), and probable maximum radiation can be calculated from a nomogram (Sorrentino and Yalone, 1950; Osborn, 1955). When indicated, these dosages should be referred to tables of maximum permissible exposure values (Meschan, 1956), before further examination is undertaken. This, of course, is seldom necessary in diagnostic practice.

In private practice, the consultant radiologist can usually take his own clinical history, and assess the value of the requested examination in this light. It is then his responsibility, in the patient's interest, to consult with the clinician referring the patient if, in his opinion, unwarranted exposure is requested. One phone call can save damage by several *r*.

To the honorary radiologist, the phenomenon of the spate of requests for examinations of extremities, spine and skull that signals the presence of a new casualty resident medical officer, for soon-repeated fracture films from the latest member of the orthopædics department, for too-recurrent chest films from the medical wards, for plain films of the abdomen, noted only "for investigation", from the surgical wards, for multiple major examinations from new resident medical officers, is a phœnix too frequent, burning the passing patient in its radiance. It could be abated by increased supervision and guidance in the departments concerned.

Masking.

In diagnostic exposures at present used, radiation is applied in many examinations to regions containing the systems under examination, with little attempt to protect

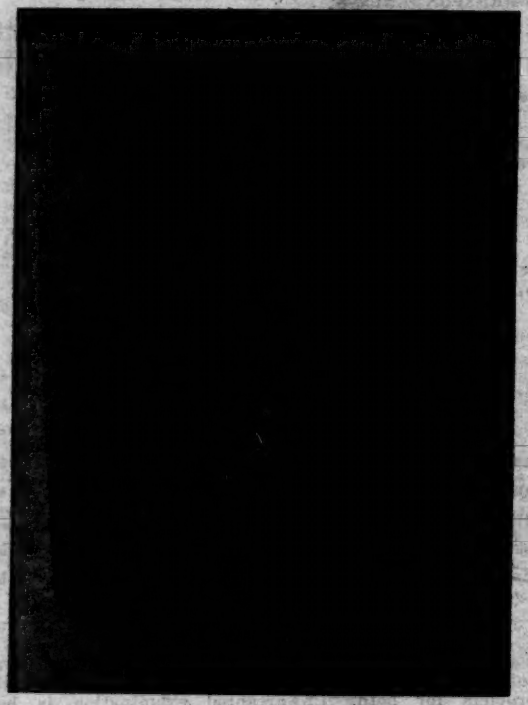

Figure I.

vulnerable adjacent tissues from which information is not required.

In the commonest examination carried out, that of lung fields and cardiovascular outline, vulnerable adjacent tissues in this category are the thyroid, thymus and reticulo-endothelial system mainly in the adjacent bones. Grawitz (1958) has pointed out that all of the reticulo-endothelial system everywhere in the body, and not only in bone, is vulnerable, so that masking should be as extensive as possible. Usually, information is not required from these regions which may be shielded largely by masking of the X-ray beam (Figure I).

For examination of paranasal sinuses, a circular cone should be used to exclude the calvarium, with the consideration of shielding of the bone marrow, as well as the usual reason of restriction of unsharpness due to scatter from its calcified portions.

In abdominal examinations, as for renal tract investigations, most of the films can be taken with masking of the adjacent reticulo-endothelial system and gonads in male patients (Figure II). Scatter is also diminished by a desirable amount from the calcified tissues, giving increased film contrast (Seeman, 1958).

The gonads are preferably masked in most examinations of both males and females by a lead rubber shield being interposed over the organs, for psychological as well as for practical reasons.

A simple method of masking can be carried out effectively with any diagnostic equipment, with the use of a light-beam diaphragm, projecting the image of a selected plane lead mask attached to the end of a cone (Figure III). A single cone of round, square or oblong exit, of sufficient size to cover a 14 by 17 inch film at 36 inches will suit all usual requirements. A slide holder is fitted at its exit, into which sheet lead slides with relevant sizes and shapes cut out to suit different examinations are placed (Figure IV). Unsharpness of masking due to penumbra is not a difficulty if this mask is at a distance of 18 inches or more from the focal spot of the tube. This combination allows effective aiming of the mask for centring and coverage purposes.

In the apparatus illustrated, the holder for the slides is mounted on rods, to allow continuously variable adjustment of the projected beam area (Figure V). This allows the cut-out for any region to be easily adjusted to the size of the patient, coverage being shown by the light beam. (Figure VI). The beam is coned by the shutters in the diaphragm, and no surrounding shield is needed for the slide holder.

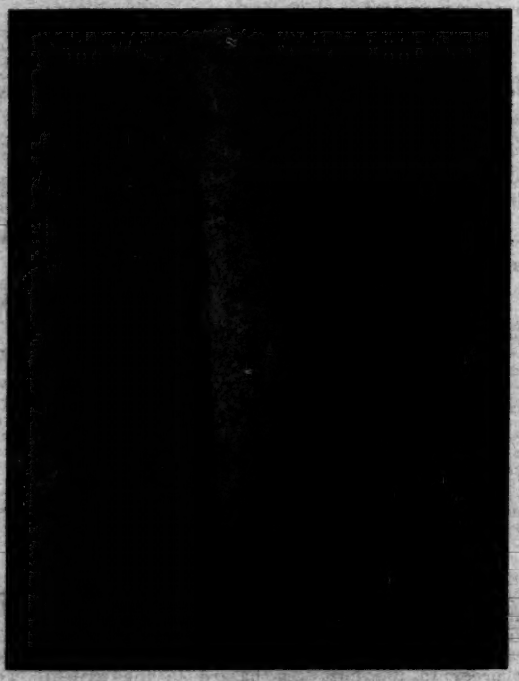

Figure II.

Slides are made of sheet lead one-sixteenth of an inch in thickness, and have an effective size of 7·0 by 8·5 inches if used 18 inches from the target, to cover a 14 by 17 inch film at 36 inches target-film distance. The effective size is halved for use at 72 inches target-film distance, and all lead cut-outs are mounted on a one-eighth of an inch "Perspex" sheet to stiffen and protect them from damage.

Reduction of Dose and Number of Exposures.

Reassessment of present routines and techniques used can lead to a reduction of the dosage rate, the size of the irradiated field and the number of exposures made for adequate examination.

The dose rate can be reduced by filtration, and two mm. of aluminium are recommended between 50 and 70 kilovolts peak, three mm. from 70 to 100 kilovolts peak, and an additional 0·25 mm. of copper above 100 kilovolts peak. This produces "harder" radiation with less scattering, and mainly reduces skin dosage. In present diagnostic practice, filters are seldom altered to suit the exposure factors in different examinations, and more use should be made of this adjustment.

Investigations carried out by Dr. Alice Stewart and colleagues (1956, 1958) indicate the importance of minimizing ante-natal exposure to avoid later malignant disease, and apart from clinical considerations, exposures war-

FIGURE III.

ranted must be minimal. High voltage techniques with suitable fast screens and high grid ratios have become available for this, and detailed descriptions, amply supplied by commercial sources, are not a function of this paper. Detailed recommendations have been made for such techniques by Bewley, Laws and Myddleton (1957) of Hammersmith Hospital. Positions are chosen to avoid heavy exposures, as were necessary for the supero-inferior view of the pelvic inlet.

As information required from the fœtus and adjacent pelvis does not require much detail, but rather contrast of the soft tissue and calcified parts, it is suggested that exposure be restricted to a minimum to define the parts to be visualized by the above-mentioned techniques, and

FIGURE IV.

that the films so obtained be submitted to logEtronic (St. John and Craig, 1957) contrast increase when this is available, as it soon should be in major hospitals. LogEtronography makes use of the photographic function log E for its principle, and is a combined optical and electronic method of contrast alteration with the use of automatic "dodging". Any X-ray film can be reproduced with changed contrast. The apparatus is housed in a single cabinet, and is simple to use, the contrast desired being selected by a knob control.

I have had no personal experience with use of the logEtron, but have found that the method of reducing exposure until the fœtal or pelvc parts are just perceptible under optimal viewing conditions allows the use of half or less of the previously used radiation to produce a diagnostic film. This technique produces a grey film, which is not a "pretty picture", and may earn the rebuke of the obstetrician referring the patient. However, it must be admitted that it is diagnostic, and is justified in the light of the irradiation saved.

Experiment and experience are needed to ensure that the exposure does not fall below the diagnostic contrast level, which would defeat its own purpose. Technical factors are critical, and are not quoted as they are not transferable, and must be found for each individual diagnostic set-up. The use of a logEtron should allow further reduction of required exposure by this method, and give a film of normal or supranormal contrast.

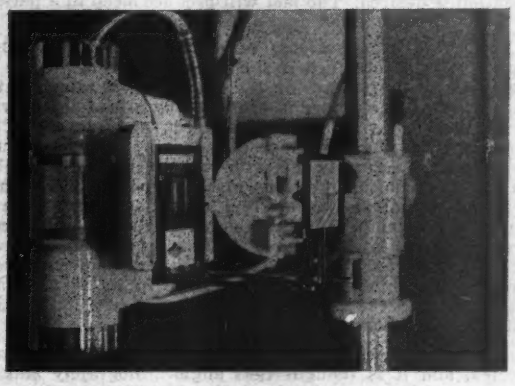

FIGURE V.

In fœtal and pædiatric examinations, these methods of reduction of exposure would show their greatest benefit, and further research is indicated to evolve satisfactory minimum techniques.

Another type of examination requiring heavy exposure to vulnerable tissue is angiography, and in such cardiovascular, cerebral, renal and other examinations the method whereby exposure is reduced until there is just perceptible contrast of the medium and then selected films

FIGURE VI.

are submitted to logEtronic contrast intensification, should be used as a routine measure when available.

Another routine use of exposures to produce minimum contrast with later intensification should be in hysterosalpingography, usually performed during the child-bearing age, to minimize genetic effects. In cases of cholecystography, cholangiography and urography, in which medium concentration or calculus visualization is inadequate, re-examination may be saved by selected logEtronography.

In pædiatric radiography, difficulty in producing a film without movement blurring is often found by radiographers lacking special training and equipment for this

work, and it is not uncommon that exposures are repeated in an attempt to produce a film satisfactory to the radiologist. Usually the child becomes increasingly excited and uncooperative, and later films are less liable to be diagnostic. Careful preparation and stage management of the circumstances for the initial exposure can best avoid this vicious circle, which can lead to a large radiation dosage, resulting in an unsuccessful examination.

In private practice, with impulse timing to 1/100 second available, if movement blurring is anticipated, preliminary sedation may be necessary. "Nembutal" and chloral are satisfactory, or "Pentothal" given *per rectum* if heavier sedation is desired. The last will produce sleep in a patient 5 to 10 minutes after administration.

For chest examinations, satisfactory "first-shot" films can usually be obtained if the child is held suspended by its arms by the mother or the attendant standing behind the cassette. The holder is protected by a lead shield with arm holes or by a lead-rubber apron and gloves. This technique has the advantage of enlarging the visible lung field areas by gravity effect on the liver. A restraining band for decubitus positions also helps immobilization.

In abdominal and renal tract examinations, the use of an infra-red lamp over the abdomen causes a reflex contraction of the intestine, thus minimizing gas shadows even after a child has been crying. With subcutaneous pyelography, the child usually falls asleep in its warmth and light during the examination, giving immobility and eliminating resistance to positioning.

In cases in which congenital cardiac defects are suspected, and it is thought that angiocardiography may be necessary, it is obviously better to limit preliminary investigation to an ordinary chest film. Screening should be avoided if possible, as this exposure must be repeated when the child reaches a congenital heart clinic.

Movement blurring is no longer a practical problem in ordinary diagnostic examinations, when apparatus of 1000 milliampères capacity, as used in children's hospitals, is available, enabling impulse-timed exposures of 1/100 or 1/120 second to be used. In angiography and such procedures, however, shorter exposures are desirable, and a dynapulse timer (Young *et alii*, 1958) has now been devised to produce photographically effective exposures of 1/2000 second. Wegelius and Lind (1953) state that the maximum tolerable exposure in angiocardiography in infants is 0·02 to 0·04 second, depending on heart rates. With this electronic switching, angiocardiograms are obtained at exposure times of 0·003 second. This millisecond exposure will stop motion of 80 cm. per second, approaching the estimated maximum rate of blood flow.

Numbers of exposures may be reduced by increased selective supervision of serial examinations, when a radiologist is available throughout the examination period, as should be the rule in private practice and in most hospital departments. It is at present usual to carry out a comprehensive set routine for intravenous pyelographic examination, exposures being made for a preliminary plain film, then after injection of medium, some three further exposures after about 5, 15 and 30 minutes, extending this period further if excretion is delayed. The exposure administered in this common examination is unnecessarily large for required diagnostic information in most cases, and under film-by-film supervision with latest media, may often be reduced to that for: (*a*) a preliminary plain film 14 by 17 inches; (*b*) a masked film 14 by 17 inches, 15 minutes after injection; (*c*) a masked or coned film of minimum size adequate for the region of pathology, depending on further information required after (*a*) and (*b*) are assessed, and if necessary repeated.

When screening is being performed, fluoroscopic exposure may be minimized by the use of electronic image intensification (Miller, 1957), and the advantage of this method must not be lost by failure to use maximum dark adaptation.

Comparison of factors used in conventional fluoroscopy and with the image amplifier indicates an 80% decrease in skin exposure to the patient, and an 88% decrease in exposure to the male gonads.

Whatever the screening mechanism, full dark adaptation is obligatory to minimize radiation required for perception. A further reduction can be made by practice of the "snap-shot" technique. This consists in the adjustment of the beam area to a practical minimum by manipulation of the shutters before the switch is operated, and the beam is aimed before exposure at the region of the patient requiring examination. The switch is kept on for the minimum time required to comprehend the picture, and then immediately switched off before the screen is moved. With practice, this method of repeated, short, pre-aimed exposures will give full information, with irradiation of both patient and radiologist reduced to a minimum.

For barium-meal X-ray examinations, spot films taken during screening should be made with the beam reduced, so that its edge is visible at the frame in each exposure, or smaller if possible, and the number selectively minimized for each case requirement.

In colon examinations (Moreton *et alii*, 1951; Morgan, 1958), more information per exposure is obtainable from films taken after inflation, with a minimum of barium present, as scattered secondary radiation is decreased. Microfine barium, such as supplied by "Rayso", suspended by "Cologel" (methyl cellulose) gives effective coating, and tannic acid may be added if it is desired to stimulate contraction. Inflation is carried out with carbon dioxide flowing at two litres per minute, rather than air, to eliminate risk of gas embolism (Stauffer *et alii*, 1956). The number of films required can be minimized to a prone and a supine film to cover the whole colon, this method giving maximum mucosal visualization with differential pooling of residual barium in the dependent loops. Further spot films may be taken as required, and the filling view of the sigmoid loop during influx is always warranted to avoid later obscurity by filled small bowel. This method provides increased contrast by the barium-air density gradient, as well as reduced scatter.

In casualty examinations, a higher average of diagnostic first examinations can be obtained by a small but visible degree of displacement being deliberately caused in fractures of bones in which the fracture line, if undisplaced, is difficult to visualize. In suspected fractures of the scaphoid, the operator may do this by asking the patient to pull on the thumb with the contralateral hand, with the injured hand dorsiflexed, or by pushing the base of the first metacarpal medially towards the palm. For suspected rib fractures, slight displacement may be caused by the shoulder being raised if the upper part of the chest wall is involved, or by the rib tips being compressed if lower in the chest.

Skin dosage is decreased by the use of maximum practical target-skin distance in all examinations. Thus a target-film distance of not less than 36 inches is advisable in all table-top exposures.

Summary.

This paper considers the problems of reduction of radiation exposure in diagnostic examinations at the present stage of technical knowledge and with the apparatus available.

Increased consultation is suggested between the clinician and the radiologist.

A method of selective masking by lead slides is described.

Techniques to minimize effective radiation are discussed, with relation to antenatal, pædiatric, angiographic, fluoroscopic, contrast media and casualty examinations.

References.

BEWLEY, D. K., LAWS, J. W., and MYDDLETON, C. J. (1957), "Maternal and Fœtal Radiation Dosage during Obstetric Radiographic Examinations", *Brit. J. Radiol.*, 30: 286.

GRAWITZ, P. B. (1958), "Childhood Malignancies", *Brit. med. J.*, 2: 510.

LINCOLN, T. A., and GUPTON, E. D. (1958), "Radiation Doses in Diagnostic X-Ray Procedures", *Radiology*, 71: 208.

MESCHAN, I. (1956), "Roentgen Signs in Clinical Diagnosis", Saunders, Philadelphia and London: 40.

MILLER, A. O. (1957), "Electronic Amplification of Fluoroscopy [illegible] ce", *8th. med. J. (Bgham, Ala.)*, 50: 665; *Radiology*, 70: 619.

MORETON, R. D., COOPER, E. M., and FOEGELLE, E. F. (1951), "Simple One Stage Method of Double Contrast Study of Colon", *Radiology*, 56: 214.

MORGAN, J. (1958), "Colon Examination by Barium Enema with Inflation", *Radiographer*, 6, No. 4: 12.

NATIONAL RADIATION ADVISORY COMMITTEE, THE (1958), Report o ne Prime Minister", MED. J. AUST., 2: 398.

OSBORN, S. B. (1955), "Radiation Exposure of the Patient in Diagnostic Radiology", *X-Ray Focus (Ilford)*, 1: 2.

SEEMAN, H. E. (1958), "Physical Factors which Determine Roentgenographic Contrast", *Amer. J. Roentgenol.*, 80: 112.

SORRENTINO, J., and YALONE, R. (1950), "A Nomogram for Dose Determinations in Diagnostic Roentgenology", *Radiology*, 55: 748.

STAUFFER, H. M., DURANT, T. M., and OPPENHEIMER, M. J. (1956), "Gas Embolism", *Radiology*, 66: 686.

STEWART, A., WEBB, J., GILES, D., and HEWITT, D. (1956), "Malignant Disease in Childhood and Diagnostic Irradiation in Utero", *Lancet*, 2: 447.

STEWART, A., WEBB, J., and HEWITT, D. (1958), "A Survey of Childhood Malignancies", *Brit. med. J.*, 1: 1495.

ST. JOHN, E. G., and CRAIG, D. R. (1957), "LogEtronography", *Amer. J. Roentgenol.*, 78: 124.

WEGELIUS, C., and LIND, J. (1953), "Evaluation of Heart Dynamics", in "Modern Trends in Diagnostic Radiology", edited by McLaren, J. W., Series 2, Hoeber, New York.

YOUNG, B. R., FINCH, R. B., MACMORAN, J. W., STAUFFER, H. M., and OPPENHEIMER, M. J. (1958), "Ultra-Short (Millisecond) Timing in Roentgen Diagnostic Procedures including Angiocardiography: Comparison of Dynapulse and Impulse Timing", *Amer. J. Roentgenol.*, 80: 375.

SOME PERPLEXING PARADOXES IN TROPICAL EOSINOPHILIA.

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IN recent months there appears to be a renewed interest in the syndrome of tropical eosinophilia. Following on the communication of Buckley (1948), a more recent contribution by Kariks (1948) offers some very apposite comments on the pathogenesis of this condition. Kariks has been the first to record this syndrome from New Guinea, and in doing so has also added three cases of this syndrome to about twenty others in the literature, in which microfilariæ were found in either the blood stream or the lymph nodes. Facts seeming stranger than fiction, what he has recorded cannot be dismissed lightly as another case of misidentification, as Kariks has found *Microfilaria bancrofti* in the blood of three of his patients.

Considering that I have had the opportunity of investigating and treating nearly a thousand cases over the past sixteen years, having in fact been the first in this field of research in Ceylon (*Carter et alii*, 1944), it will be opportune for me to discuss certain paradoxical aspects associated with this syndrome.

Paradox I.

Other men, no doubt,
Years hence, will use the footholes that he cut
In those precipitous cliffs, and reach the height.

—ALFRED NOYES, "The Torch Bearers".

The first comprehensive report on this syndrome was published by Frimodt-Moller and Barton (*1940*). They found that its symptoms and signs were sufficiently constant to be considered as an entity, and called it pseudotuberculosis. The earliest record, however, was found in a paper by Roy and Bose in the *Calcutta Medical Journal of 1918. This was based on a study of 140 cases of bronchial* asthma associated with eosinophilia, and it also recorded the successful use of the organic arsenical—"Soamin". More specific observations were made by Gosh, in the *Glasgow Medical Journal* in 1918, who observed that "cases in which there is no eosinophilia do not improve with 'Soamin'". He was, however, referring to cases of asthma, which at that time was considered an entity.

Although Frimodt-Moller and Barton realized that their cases belonged to a new entity, they were concerned only in showing that the condition was not associated with tuberculosis. They were also unaware of the therapeutic effects of organic arsenicals, because they treated their cases with palliatives. When they called the condition pseudo-tuberculosis, they chose an altogether unfortunate name, because it gave the lay public an impression that patients diagnosed as such were prospective candidates for a tuberculosis sanatorium. It was therefore very welcome when Weingarten (1943) described 81 cases, stressed the four cardinal features of the entity and called the syndrome tropical eosinophilia. He thought that it was an infection and not an allergic reaction, and that it was commonly found in people who live by the sea.

As neither its ætiology nor its pathology was known, Weingarten's appellation went into usage as it stressed the eosinophilia, suggested that it was confined to the tropics and implied that it had no connexion with tuberculosis. It was unfortunate that the pioneers' choice of name for this syndrome, although they thought it was a hypersensitivity reaction, should have relegated their work into the limbo of forgotten things, because it has now opened up new vistas in the field of host-parasite relationships and metazoan immunity—fields which appeared to have been exhaustively studied by, to name a few, research workers like Chandler, Taliaferro, Blacklock, Gordon, Sarles and Faust.

Paradox II.

Ten thousand minds . . .
Unconsciously laboured there, each set on its task,
And each set apart, with its own small lamp in the dark.

—ALFRED NOYES, "The Torch Bearers".

The syndrome, according to the earlier workers, was characterized by four easily recognizable features (Chaudhuri, 1943; D'Abrera, 1945): (i) a persistent cough, with or without asthma, usually present in the early hours of the morning, and producing tenacious, difficult-to-expel pellets of mucus; (ii) a sustained high eosinophil count associated with leucocytosis; (iii) a therapeutic response to organic arsenicals—later piperazine compounds were found more effective and safer than the arsenicals; (iv) a characteristic radiological miliary mottling of the lungs, which was usually found in from 50% to 75% of cases.

Other features associated with the syndrome, though not invariably present, included fever, lymphadenopathy, splenomegaly, hepatomegaly, hæmoptysis, urticaria, arthritis, carditis, creeping eruptions, and the production of Jarisch-Herxheimer reactions following treatment with organic arsenicals and to a lesser extent with piperazine compounds.

Its ætiology and pathogenesis remained unknown, but the syndrome was recognized on account of its cardinal features, and was recorded from India, Ceylon, Curaçao, Africa, Malaya, the Americas, Indo-China, South-West Pacific Islands, Indonesia and now from New Guinea. As *was to be expected, opinions with regard to its pathogenesis* varied, but by 1945 had crystallized into two main schools of thought. Some believed the syndrome was an allergic reaction, while others were equally convinced it was due to a bacteriological infection. At the present time all agree *that the syndrome is an allergic reaction.*

As research into its ætiology and pathology progressed, various synonyms found their way into the literature; each author was convinced that he was right, and entitled by virtue of his discovery to rename the syndrome, and so *we have as synonyms eosinophil lung, pulmonary acariasis,* tropical pulmonary eosinophilia, benign eosinophil leukæmia, visceral larva migrans, infiltrative eosinophilia, pulmonary eosinophilosis, eosinophil respiratory syndrome,

pulmonary ascariasis, pulmonary ankylostomiasis and pulmonary filariasis.

That this syndrome could be caused by a variety of agents, some of these synonyms demonstrate. In this respect Löffler's syndrome, a condition resembling tropical eosinophilia, but with a fleeting symptomatology and confined to the temperate regions, is now known to be caused by a variety of agents, vegetable and animal in origin, in individuals who have an allergic diathesis, but even so it has not been thought necessary to rename Löffler's syndrome. It is therefore difficult to understand why its counterpart in the tropics should bear so many synonyms. I see no reason why some cases of tropical eosinophilia, when caused by ascaris, should be labelled "pulmonary ascariasis resembling tropical eosinophilia", or other cases named "visceral larva migrans" when due to the migrations of *Toxocara* larvæ. Whether this entity is produced by ascarids, ankylostomes, *Toxocara*, human-host filariæ, zooparasitic filariæ or *Strongyloides*, they all produce a disease which satisfies the prerequisites of the syndrome, and should therefore bear the same label. It would now appear, and herein lies the paradox, that the conception of what should be considered as cases of tropical eosinophilia is being narrowed down with the discovery of each new ætiological agent, and very soon by this process of exclusion, tropical eosinophilia will perhaps cease to exist as an entity. The fundamentals which have been overlooked are that the pathology, pathogenesis, symptomatology and therapeutics of this syndrome remain the same, although the causal agents vary (D'Abrera, 1958 *a*, *b*, *c*; 1959).

If the law of priority governing nomenclature is to be upheld, and if this syndrome cannot be called pseudo-tuberculosis owing to confusion with tuberculosis, then it should be labelled tropical eosinophilia, because this name pre-dated all others.

There now appears to be a move to include the filarial complement fixation test as a fifth requisite of this syndrome, so as to reject those cases which are not due to filaria of animal origin, but by the same token an ascaris complement fixation test and perhaps other specific antigen tests would in turn exclude those due to zooparasitic filaria; ultimately, the entity will cease to exist. There are several factors which contribute to the pathogenesis of this syndrome other than the heterogeneity of its ætiological agents, but they are beyond the scope of this paper, and have been dealt with elsewhere (D'Abrera, 1959).

Paradox III.

. . . For in these wars,
Whoever wins a battle wins for all.

—ALFRED NOYES, "The Torch Bearers".

A distinct relationship exists between hosts and their parasites. This relationship is considered "high", or species specific, when the parasite is able to complete its life cycle and successfully propagate itself, while producing a minimum reaction in host tissues. The relationship is considered "low", or non-specific, when the parasite is unable to complete its life cycle, its migrations being invariably accompanied by severe reactions in host tissues. Adaptability is therefore an evolutionary process necessitated by the struggle to survive in an unfavourable environment. In an abnormal host the finer adjustments between host and parasite are missing, and usually the parasite fails to survive. This is brought about either by an overwhelming immune response in host tissues or by the absence of specialization in the parasite to meet the demands of migration necessitated by sudden changes in environment or by a combination of both. Chandler (1950) aptly expressed it as follows: "In strange hosts parasites become aimless wanderers unable to find their way to the localities where they could mature." However, there is a certain amount of adaptability sometimes found with particular parasites in hosts which are closely related, e.g., man and monkeys, frogs and toads, so that where a human-host parasite would be unable to adapt itself in a sheep it may with difficulty do so in a monkey or an ape.

In discussing the role of the Filarioididæ in producing tropical eosinophilia, I suggested (D'Abrera, 1959) that if all cases of tropical eosinophilia associated with filariæ were to be considered as due to zooparasitic filaria (zoonosis[1]), it would be difficult to explain the presence of microfilariæ in the blood and lymph nodes in the authentic cases reported in the literature, without either postulating a double infestation with both human and animal species, or accepting the possibility that both human and zooparasitic species were equally capable of producing this syndrome.

In this discussion I also drew a parallel from the work of Innes and Shoho (1953) on lumbar paralysis in domesticated animals, in which they found that the paralysis was due to an unnatural host-parasite relationship. Although the causal organism was found by Japanese workers to be due to the migrations in the brain of infective larvæ of *Setaria digitata*, these two authors preferred the name of "nematodiasis" to "setariasis", because they were convinced that the disease might have a multiplicity of helminthic causes, which would behave in the same way as these immature filariæ in unnatural hosts, and produce the same pathological disorder. I must, however, state that the suggestion that an occult zoonotic filariasis could result in this syndrome was made to me by Professor McGaughey, of the Faculty of Veterinary Science, University of Ceylon, when I was associated with his department in 1954.

Recently, Buckley (1958) inoculated a human volunteer with *Wuchereria malayi* from a monkey (morphologically identical with the human form of *W. malayi*, and therefore regarded as a race rather than as a different species), and after twenty months obtained an eosinophil count of 12,240 per c.mm. of blood, and a filarial complement fixation test titre of 1/80 eight months later. The patient also developed a cough which lasted three months, which was controlled with "Aureomycin". It is unlikely that the infective stage larvæ would have gone on to maturity within this period in an abnormal host, therefore the reactions in the volunteer must have resulted from the migrations of the larvæ comparable to "creeping eruptions" produced by animal-host ankylostomes. Twenty-two months later, by which time the *W. malayi* would have grown to maturity (assuming they were able to adapt themselves) and produced larval forms, he inoculated a zooparasitic species, *W. pahangi*, from a cat into the same individual, and within the brief period of ten weeks produced a typical attack of tropical eosinophilia (except that the skiagrams of the chest showed normal findings), which responded to diethylcarbamazine. The eosinophil count rose to 30,375 per c.mm. of blood, and the filarial complement fixation test titre increased to 1/640. The highest initial titre obtained by Danaraj *et alii* (1957) was 1/160, their lowest 1/40 in their 12 cases of tropical eosinophilia.

It was not possible for the zooparasitic filariæ to have reached maturity within this short period, even if these parasites were capable of maturing in abnormal hosts, therefore their migrations would have triggered off an immune reaction to produce the syndrome in an individual who was earlier sensitized with *W. malayi*. If the *W. malayi* had produced "occult" microfilariæ (Buckley found none in the blood), it would not be unreasonable to expect that this same immune response would have destroyed the covert microfilariæ, which in turn would have provided antigen to step up the eosinophil count and the filarial complement fixation test titre, while at the same time exaggerating the symptomatology in the volunteer. The diethylcarbamazine killed off the offending migrants and cut short the attacks. Should the earlier worms have reached maturity, and some were able to survive the treatment, it would not be altogether surprising if Buckley found microfilariæ in this volunteer on some future occasion.

This interpretation would not only explain the pathogenesis of this syndrome when caused by animal-host

[1] A zoonosis is a host-parasite assemblage entirely unrelated but potentially pathogenic to man, in which man accidentally becomes the parasite's temporary maintaining host.

filariæ alone, but also when superimposed on an already existing filariasis. It would also account for the absence of microfilariæ in some cases of tropical eosinophilia, and for the scantiness of microfilariæ in others when due to filaria (D'Abrera, 1958 *a*, *b*).

In fact, I envisage possible combinations of migratory helminths, which may be equally capable of producing the syndrome, other than that experimentally produced by Buckley, more so if their antigenic components are similar, and if the assaulting dose comes from a migrant with a low species specificity.

The mechanism of production of this syndrome (D'Abrera, 1958*c*; 1959) is in no way different from the ordinary antigen-antibody reaction which follows the subcutaneous injection of serum, with the exception that host tissue damage (which is severe with zooparasites) must play some part in the over-all symptomatology. Three factors are usually necessary, but any two of these could operate to produce a hypersensitivity reaction: (i) an inherited state of sensitivity to a foreign protein; (ii) a primary inoculation or sensitizing dose, usually necessary if (i) is absent; (iii) a secondary inoculation or assaulting dose, unessential if (i) is present.

As an example of the combination of (i) and (ii), the migrations of human-host helminths may be cited (some authors believe this is Löffler's syndrome), while a combination of (ii) and (iii) would be seen in Buckley's case. Further, since it is also possible to elicit serum sickness with a very large primary subcutaneous injection of serum after the lapse of eight to twelve days, due to the interaction of "early" formed antibody with the "residual" antigen of the primary dose, the effect on the host of a heavy primary infestation with a low host specificity parasite becomes easy to appreciate.

As Taliaferro and Sarles (1939) showed, it is the parenteral migratory nematodes which incite a considerable immune response in their hosts, and since this immunity can be passively transferred, it can also be quantitatively measured. Using the Wassermann complemen fixation test, D'Abrera and Stork (1946) obtained 75% double positive reactions in 26 cases of tropical eosinophilia, which were later reversed after the administration of organic arsenicals. Further, the effect of treatment in some cases, besides temporarily increasing the eosinophil count, also increased the filarial complement fixation test titre (Danaraj *et alii*), this being due to the dead migrant worms providing further antigen. But Buckley's work was carried out under experimental conditions, hence the high titre.

Under natural conditions it is unusual for more than a few infective larvæ to be inoculated by a single mosquito on any one occasion, even though under optimum conditions at least 50 microfilariæ per 0·2 ml. of blood are necessary to infect a mosquito. It is more than likely, therefore, that the syndrome of tropical eosinophilia, when due to filaria, may (under natural conditions) require at least two different and distinct infestations, the primary requiring a "high" host parasite, which should go on to maturity and also produce microfilariæ before a second zooparasite could produce the syndrome.

Buckley believes that the identification of *W. malayi* from the lymph nodes in cases reported from Indonesia and Indo-China is open to doubt, and that these microfilariæ were "not from a human source but some animal species of Wucheria of the Malayi group". If Buckley's explanation of misidentification is correct, what would be the interpretation for finding *W. bancrofti* in the blood in three cases reported by Kariks, with absolute eosinophil counts of 14,940, 8910 and 7482 per c.mm., and *W. malayi* in the blood in one case reported by Jarniou and Moreau (1957), with an absolute eosinophil count of 6624 per c.mm.

In his discussion, Buckley went on to state that "the experiments clearly support the theory that the condition may be caused by filarial parasites of animals". However, he thought that these animal larvæ of *W. pahangi* and *W. malayi* proceed to maturity, and produce microfilariæ which are not found in the blood stream because they are trapped in the lymphatic nodes as foreign invaders, or alternatively "that the microfilariæ themselves are the cause of the eosinophilia, leucocytosis and pulmonary effects; that having been liberated by the adult females they make their way via the lymphatics to the lungs where they remain in the perivascular lymphatic vessels and never pass from the lymphatics to the circulatory system".

It is unlikely that microfilariæ enter the lungs directly by the lymphatics from the lymph nodes, where presumably bancroftian and malayan female filariæ would lie and bring forth their larvæ, without first entering the blood stream. In fact, it is highly improbable that if once microfilariæ enter lung tissues they would enter perivascular lymphatics, because if they did so they would return to the pulmonary circulation and never enter the systemic circulation to become available to the intermediate hosts, thereby committing racial suicide.

The lymphatic system is a closed system of endothelial lined vessels, the larger vessels being supplied with valves to ensure the flow of lymph in one direction, which collect the lymph from the various organs, including the lungs and pleura, and pass it via the afferent lymphatics into the various lymph nodes. The flow of lymph from the lungs and pleura is also controlled by valves, so that it would normally pass into the hilar glands and cannot return into the lung tissues. It is reasonable, therefore, for the microfilariæ, liberated in the lymph nodes, to pass with the lymph into the efferent lymphatics to the thoracic duct and the right lymphatic duct into the innominate veins, thence into the right side of the heart and ultimately into the lungs. The microfilariæ in the lungs could not have reached these reservoirs by way of the afferent lymphatics, because not only would they have had to swim against the flow of lymph, but they would also have had to negotiate the valves in these vessels. Once in the lung tissues it is difficult to see why only the "foreign invaders" should enter the perivascular lymphatics and remain there while the human-host species pass into the pulmonary veins to enter the systemic circulation. Once they have "missed the bus" they could return to the lungs by the portal vein or the systemic veins, or by the lymphatics through the right side of the heart to go back again into the systemic circulation.

It is not disputed that the migrations of infective animal-host filariæ alone could produce the syndrome, but in these cases no microfilariæ would be found in the peripheral blood. If, however, it is contended that zooparasitic filariæ (*Dirofilaria*, *Setaria*, etc.) could grow to maturity in man and produce even a few microfilariæ, then either these filariæ are equally adapted to man or our conceptions of host-parasite relationships need drastic revision. It cannot otherwise but be that the few microfilariæ found in the several authenticated cases of tropical eosinophilia are all human-host species, and their almost complete decimation is brought about by this seemingly paradoxical phenomenon.

Buckley's work is of outstanding merit; his interpretation of his results may be open to criticism, but he has won another battle for all.

Paradox IV.

. . . Why dislocate a world,
For one slight clash of seeming fact with faith?

—ALFRED NOYES, "The Torch Bearers".

The opinion has been expressed that this syndrome is peculiar to Indians as a race. In the sixteen years I have investigated and treated this condition, I have found the syndrome present among all races resident in Ceylon in proportion to their respective numbers: Sinhalese, Ceylon Tamils, Indians, Moors, Dutch descendants (Burghers), Eurasians, Malays and Europeans (British, French—two brothers from one family—and an Italian missionary). However, there were certain suburban towns around Colombo where the incidence was greater than in others, but this was not in any way due to racial distri-

bution but to certain epidemiological factors, primarily the incidence of filarial infections in mosquitoes, which I have dealt with elsewhere (D'Abrera, 1958b, 1958c). While in Malaya, I was informed by a British practitioner (D'Abrera, 1959) that he sees several cases of this syndrome at his clinic, and his impression was that it was commoner among Chinese because most of his patients were Chinese.

In the twelve cases in which Danaraj *et alii* performed the filarial complement fixation test, there were three Chinese, one Jew and eight Indians, but the highest initial titre of 1/160 was recorded in a Chinese, while a titre of 1/320 recorded during treatment was also in another Chinese; so that if a quantitative estimation of the immune response was taken as an indication of susceptibility, the Chinese should be considered more susceptible than the Indian.

I cannot agree with the opinion that this syndrome is peculiar to Indians, and suggest that the following circumstances may have contributed to this impression.

It is quite reasonable to expect that, all things being equal, Indians would prefer to be treated by Indian doctors, and that the Chinese would indicate their preferences for Chinese practitioners. Further, it is a well-nown fact in Singapore, from where this opinion originated, that many Chinese, who constitute 80% of the population, especially those from the poorer classes, patronize the Chinese practitioners of traditional medicine for ailments like coughs and colds, and since tropical eosinophilia is a distressing malady only in the asthmatic phase of the syndrome, many of these patients do not seek treatment at the Tropical Eosinophilia Clinic of the General Hospital, Singapore, which is conducted by an Indian doctor. The more well-to-do Chinese, on the other hand, usually attend the clinics of several British practitioners on the island.

It is also possible that the opinion about the susceptibility of Indians to tropical eosinophilia originated in 1951, when the author of this statement was then of the opinion that the syndrome was due to an infection by a virus; but there is no reason for perpetuating a fallacy now that Buckley has produced experimental evidence, which puts the onus on the intermediate host and not on the genetic make up, texture of skin or colour of an individual, at least in a fair proportion of cases of tropical eosinophilia in Ceylon, India and Malaya. In fact no human community is exempt from the attentions of blood-thirsty mosquitoes, whatever the colour of their skin or whatever their ancestry, and mosquito-borne diseases are found in Europeans, Indians, Chinese and even Australians. Tropical eosinophilia is a syndrome produced by a variety of migratory nematodes, the predominating agent varying in different countries.

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References.

BUCKLEY, J. J. C. (1958), "Occult Filariæ Infections of Animal Origin as a Cause of Tropical Pulmonary Eosinophilia", *E. Afr. med. J.*, 35: 493.

CARTER, H. F., WEDD, G., and D'ABRERA, V. ST. E. (1944), "The Occurrence of 'Mites' (Acarina) in Human Sputum and Their Possible Significance", *Indian med. Gaz.*, 79: 163.

CHANDLER, A. C. (1950), "Introduction to Parasitology", 8th edition, John Wiley and Sons, New York.

CHAUDHURI, R. N. (1943), "Eosinophil Lung", *Indian med. Gaz.*, 78: 575.

CHAUDHURI, R. N. (1956), "Tropical Eosinophilia", *J. Indian med. Ass.*, 27: 195.

D'ABRERA, V. ST. E. (1945), "Acarina Infection with Reference to Asthma", *J. Ceylon Br. Brit. med. Ass.*, 41: 10.

D'ABRERA, V. ST. E. (1958a), "Tropical Eosinophilia: Some Atypical Cases of Clinical Interest", *Med. J. Malaya*, 13: 460.

D'ABRERA, V. ST. E. (1958b), "The Ætiology of Tropical Eosinophilia with a Preliminary Note on the Pathology of the Syndrome", *Ceylon med. J.* (n.s.), 4: 195.

D'ABRERA, V. ST. E. (1958c), "The Pathology of Tropical Eosinophilia, its Nature and its Relation to Allergic Diseases of the Lungs", M.D. thesis, University of Malaya, Singapore.

D'ABRERA, V. ST. E. (1959), "Tropical Eosinophilia: An Ætio-Pathological Study", *Proc. Alumni Ass. Malaya* (in the press).

D'ABRERA, V. ST. E., and STORK, K. (1946), "Serological Reactions in Tropical Eosinophilia", *Indian med. Gaz.*, 81: 282.

DANARAJ, T. J., DA SILVA, L. S., and SCHACHER, J. F. (1957), "The Filarial Complement Fixation Test in Eosinophil Lung (Tropical Eosinophilia)", *Proc. Alumni Ass. Malaya*, 10: 109.

FRIMODT-MOLLER, C., and BARTON, R. M. (1940), "Pseudo-tuberculosis Condition Associated with Eosinophilia", *Indian med. Gaz.*, 75: 607.

GHOSH, B. N. (1918), in Chaudhuri, R. N. (1956), *loco citato.*

INNES, J. R. M., and SHOHO, C. (1953), "Cerebrospinal Nematodiasis, Focal Encephalomyelomalacia of Animals Caused by Nematodes (Setaria digitata); a Disease which may Occur in Man", *Arch. Neurol. Psychiat. (Chicago)*, 70: 325.

JARNIOU, A. P., and MORRAU, A. (1957), *"Eosinophilie pulmonaire tropicale et filariose", J. franç. Méd. Chir. thor.*, 11: 547.

KARIKS, J. (1958), "Tropical Pulmonary Eosinophilia", MED. J. AUST., 2: 773.

NOYES, ALFRED (1937), "The Torch Bearers", Sheed and Ward, London, page 3, line 6; page 340, line 14; page 122, line 16; page 57, line 6.

ROY, B. C., and BOSE, C. C. (1918), quoted in Chaudhuri, R. N. (1956), *loco citato.*

TALIAFERRO, W. H., and SARLES, M. P. (1939), "The Cellular Reactions in the Skin, Lungs and Intestines of Normal and Immune Rats after Infection with Nippostrongylus muris", *J. infect. Dis.*, 64: 157.

WEINGARTEN, R. J. (1943), "Tropical Eosinophilia", *Lancet*, 1: 103.

A STUDY OF DEMAND FEEDING AND ROOMING-IN OF BABIES.

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PRESENT-DAY METHODS of neonatal management in Australia are reflecting a change of thought as regards the wisdom of nursery control. Some institutions are turning away from the mass collection of normal healthy babies, who are taken out to their mothers at four-hourly intervals, and in its place are endeavouring to substitute a more natural and safer way of life for the newborn. Many advantages which may be claimed for the nursery system are now questioned and, it would seem, are outnumbered by its disadvantages.

The most outstanding offending organism today is the staphylococcus, which is primarily spread by direct contact, and until this fact is universally realized and combated by reducing the number of people actually handling the new baby, there will be no effective reduction in infections of the newborn. The handicap of the baby born and cared for in an institution need not be augmented by collecting it together with many others in the one area. Babies born at home are cared for by one or at most two people, so their risk of staphylococcal infection must be considered the lowest attainable. The mother, on the other hand, is generally considered more safely delivered in an institution, so that the ideal would appear to be a combination of the benefits of institutional delivery and the after-care of the home. One way of attempting this ideal is to revert to the system prevailing before the introduction of the nursery system and, once more, ask the mother to care for her own baby whilst she is in the maternity unit.

The nursery system has become so universally accepted in Australia that the mention of a change to "rooming-in" of the healthy babies often provokes opposition with the

emphasis on its disadvantages. Because of many differences of opinion, it seemed opportune to make an attempt to obtain some factual information. The opening of the 114-bed maternity section of the Queen Elizabeth Hospital in the middle of 1957 provided an ideal opportunity for a survey of several aspects of this broad question. (A temporary section of this hospital was opened for maternity patients in late 1954.)

HOSPITAL DETAILS.

The honorary system, which prevails in most Australian teaching hospitals, operates here with three major clinic units and 15 honorary obstetric officers, to whom access to private and intermediate beds is limited. Women applying for antenatal care are allotted in rotation to the three clinics.

There are three main post-natal floors, A, B and C, with a separate floor for isolation patients. Private and intermediate patients are housed on all floors in either single-bed or two-bed rooms, whilst the clinic patients occupy four-bed units. Alongside each bed is a cot, into which the baby is put after an initial interval of six to eight hours for observation in an area specially designed for this purpose. On floor C, the custom is to put the baby alongside his mother on their arrival together from the delivery floor. Instrumental, breech or Cæsarean section delivery babies are observed for 24 hours on all floors before being placed alongside the mother. Once the baby joins the mother, she begins her care of him under the direction of the staff. Any patient who so wishes may request that her baby be kept in the nursery.

Each room or unit has its own wash basin, and each patient has her own bedside cupboard and table with an overway bed table. On floor A, a specially designed "rooming-in" crib is under trial; this consists of a napkin box and swivel tray with six separate containers. The cribs on other floors are the ordinary mobile types with lift-out cots, the necessary toilet requisites being kept on the overway tables in special containers.

Babies are washed, with special precautions, on the post-natal floor before being taken to the bedside cot; thereafter they are oiled daily.

Women on floors A and B are usually not allowed up until the fourth or fifth day after confinement, whereas those on floor C are allowed up as soon as they wish, according to their condition. Many, therefore, are up and about at the end of 24 hours. Further differences will become apparent during the report.

THE STUDY.

The present study consisted of interviews with more than 500 consecutive mothers of healthy babies, and extended from August, 1957, to March, 1958. There was no selection of cases beyond the exclusion of premature and abnormal babies. The interviews were conducted on the sixth or seventh post-natal day, and again at the post-natal visit six weeks after delivery.

Particular care was taken at all times by the interviewer to avoid leading questions and to refrain from commenting upon answers, particularly when the interview was overheard.

The study was divided into the two main sections—different feeding methods and rooming-in. These two aspects were studied in the following four groups: Group I, 281 clinic patients from floors A and B; Group II, 162 clinic patients from floor C; Group III, 70 private and intermediate patients from floors A, B and C; Group IV, 20 babies for adoption, nursery control.

The groups were arranged in this way because on floors A and B rooming-in was practised in the daytime only, whereas on floor C babies were "roomed-in" 24 hours a day when the mothers wished it. Both systems operated in the case of the private and intermediate patients, whilst the 20 babies in Group IV, those for adoption, served as the only control of fully nursery-managed babies.

The Effect of Different Feeding Schedules on the Growth of Babies in the First Week of Life.

This study is a report on the effects of the different feeding schedules on the growth of babies within their first week of life. Demand feeding is that which is strictly in accordance with the baby's wishes, whereas routine feeding is interpreted as regular feeding according to the clock. It has been undertaken to establish whether the different schedules result in a different pattern of weight gain. For the purposes of this study, weight gain or loss was recorded at the seventh day, as all babies still remaining in hospital on this day were weighed. This seventh-day weight was then compared with the birth weight, and the gain or loss of weight was recorded as shown in Table I. Measurements were taken to within a quarter-pound.

Details of Feeding Procedures in the Groups Studied.

Different feeding methods were practised in the four groups studied.

Group I.—Babies were fed in the routine manner until the fourth day, when, according to the results of test weighing, they either continued on routine feeding until the test weighing result was satisfactory, or commenced feeding on demand. Generally, babies who wakened at night were given boiled water and glucose, after which, if they did not settle, modified milk or expressed breast milk was given.

Group II.—Demand feeding commenced as soon after birth as possible, as from the first feed, for normal healthy babies. Only those who were jaundiced, small (under 6·5 lb.) or "sleepy" were fed in the routine way. At night, babies, whether rooming-in or in the nursery, were given full milk feeds (either breast milk or artificial milk).

Group III.—Both the foregoing methods were practised, according to the floor on which a patient was accommodated, and to the wishes of the private doctor.

Group IV.—The majority of babies were fed on a strict routine, owing to complete nursery control. However, there were some babies who were partly fed on demand. That is, if babies in the nursery woke before the set feed time and were crying and obviously hungry, then they were fed. If, however, they were still asleep at the normal feed times they were wakened.

TABLE I.

Regain of Birth Weight in Relation to Feeding Schedule.

Group.	Total Number.	Demand Feeding.	Number Regaining Birth Weight by Seventh Day.	Routine Feeding.	Number Regaining Birth Weight by Seventh Day.
I	272	157	55 (35%)	115	38 (33%)
II	142	129	77 (60%)	13	7 (54%)
III	69	59	21 (36%)	10	5 (50%)
IV	20	6	3 (50%)	14	3 (21%)

Regain of Birth Weight in Relation to Feeding Schedule.

Group I.—Group I comprised 281 patients, of whom only 272 babies were available for study, as nine babies were discharged from hospital before the seventh day who had not regained their birth weight on the day of discharge. However, included in the 272 for study were two babies who were discharged on the sixth day but who had regained or passed their birth weight on that day.

Group II.—Group II comprised 162 patients, of whom only 142 were available for study, as 20 babies were discharged from hospital before the seventh day who had not regained their birth weight on the day of discharge. However, included in the 142 for study were 18 babies

TABLE IIa.

Regain of Birth Weight by Weight Groups and Feeding Schedules: Routine Feeding.

Weight Group. (Lb.)	Group I.		Group II.		Group III.		Group IV.	
	Babies Routine Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Routine Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Routine Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Routine Fed.	Babies Regaining Birth Weight by Seventh Day.
5 to 6	13	9	7	5	1	1	—	—
6 to 7	27	8	2	—	2	1	7	1
7 to 8	46	15	3	2	3	1	3	1
8 to 9	26	6	1	—	4	2	4	1
9 and over	3	—	—	—	—	—	—	—

who were discharged on the fifth or sixth day, but who had regained or passed their birth weight on that day.

Group III.—There was a total of 70 patients in this group, with 72 babies (two sets of twins), of whom only 69 babies were available for study, as three were discharged from hospital before the seventh day who had not regained their birth weight.

Group IV.—There were 20 babies in this group, all of whom were artificially fed.

Comment.—From these figures it can be seen that the majority of patients practised demand feeding in some form or other. There is a trend, though not very marked, in those infants who were demand-fed to regain their birth weight at an earlier date than those who were routine-fed. If, however, we study Group II more closely, and compare this with Groups I and III, the trend becomes more noticeable. Group II is the only group that approached true demand feeding, for in this group babies were not kept to a strict routine for four or five days as in Group I, but were demand-fed from the first feed. It was also in this group that the majority of patients practised rooming-in day and night, from which follows the fact that a baby received his proper feed of breast milk during the night (if he was being breast fed), rather than a modified milk mixture or boiled water and glucose in the nursery, as in Groups I, III and IV.

The effects of the different feeding schedules were then related to birth weight in the four groups (Tables IIa and IIb). These tables show a general tendency for a higher proportion of babies under 7 lb. to regain their birth weight by the seventh day. Also, a greater proportion of babies in Groups I, II and IV who were fed on a self-demand system regained their birth weight by the seventh day than those fed on a routine system. The fully demand-fed babies of Group II showed a significantly greater tendency to regain their birth weight by the seventh day than the partly demand-fed babies of Group I.

Regain of Birth Weight, Regardless of Initial Weight or Feeding Schedule.

More babies in Group II regained their birth weight by the seventh day than in any of the other groups, regardless of the method of feeding (Table III). This would seem to indicate that the methods adopted in Group II were responsible.

Attitude to Different Feeding Methods.

Women were interviewed at the post-natal clinic concerning their attitudes towards both routine and demand feeding methods. Thus, each woman was personally interviewed after she had had time to reflect and consider the question. Factual numbers are given, and the views of these women have been summarized.

Four hundred and fourteen clinic patients (Groups I and II) were interviewed in hospital, of whom 303 were interviewed at the post-natal clinic. One woman had no opinion; thus 302 were left for study. In hospital, 209 of these women had practised demand feeding and 93 had practised routine feeding. When questioned at the post-natal clinic, 249 patients were practising demand feeding and 53 were practising routine feeding. Although these figures show an overall increase in the numbers practising demand feeding, it was not a direct change, as some who had been demand feeding in hospital had discontinued this upon return home because they found the system unworkable and inconvenient. However, there was an even greater number who had preferred to practise demand feeding on return home, because they felt it was more convenient and the more natural and logical method to adopt.

From the interviews in hospital it was found that in all groups there were some patients who were not happy with the method of feeding which they were practising. The over-all opinion was in favour of demand feeding, and many patients who were practising routine feeding stated that they were doing so only because of the routine on that floor and would have preferred to demand-feed their infants. In many cases the self-demand feeding system was completely new to the patient, and it was found that the patients in Group I did not have as true a picture of demand feeding and as clear an understanding of the term as did those in Group II. This is understandable when it is realized that those in Group I did not commence demand feeding, at the earliest, until the fourth day. It was found in Group I that, although a patient was supposedly demand feeding, she was still influenced by the routine feeding procedure, and felt that it was expected of her to feed the baby at regular intervals so

TABLE IIb.

Regain of Birth Weight by Weight Groups and Feeding Schedules: Demand Feeding.

Weight Group. (Lb.)	Group I.		Group II.		Group III.		Group IV.	
	Babies Demand Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Demand Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Demand Fed.	Babies Regaining Birth Weight by Seventh Day.	Babies Demand Fed.	Babies Regaining Birth Weight by Seventh Day.
5 to 6	1	1	6	5	4	1	—	—
6 to 7	40	16	32	18	19	8	3	2
7 to 8	60	20	44	26	22	7	2	1
8 to 9	40	15	39	25	8	2	1	—
9 and over	16	3	8	3	6	3	—	—

as not to inconvenience the nursing staff. This attitude was apparent to a certain extent among the patients in Group III, but not among those in Group II. However, there were some patients in Group II who were not in favour of demand feeding and expressed a desire to be able to practise routine feeding so as not to "get the baby into bad ways" which would carry over after their return home.

TABLE III.
Regain of Birth Weight Regardless of Feeding Schedule.

Group.	Total Number.	Regained Birth Weight by Seventh Day.
I	272	93 (34%)
II	142	84 (59%)
III	60	26
IV	20	6

Night Feeding.—The effects of the different feeding methods were compared with regard to the discontinuance of a night feed at the sixth week interview. Night feed was taken to mean any feed between 10.30 p.m. and 4 a.m. Three hundred and three women were interviewed at the sixth week, of whom 289 were studied with regard to this question. This 289 comprised 243 women who had been demand-feeding their babies and 46 who had been routine-feeding them. One hundred and thirty-six of the 243 babies on demand feeding and 32 of the 46 babies on routine feeding had dispensed with the night feed. Although there was a considerable difference in the numbers in each group, the tendency was quite apparent for the routine-fed babies to dispense with their night feeds before the demand-fed babies.

Views on Rooming-in.

Many aspects of rooming-in were covered in this study. Views and opinions as stated by women at the time of the interview are now presented.

At the interview in hospital on the sixth or seventh day after delivery, women were asked: "Given your own free choice, where would you prefer your baby — in the nursery, rooming-in during the day or rooming-in day and night?"

Five hundred and thirteen patients gave their views; 305 were in favour of rooming-in during the day only, 182 were in favour of rooming-in day and night, 24 were in favour of nursery control, and two patients had no preference. Thus a majority of 95% was in favour of rooming-in when interviewed in hospital. Tables IV and

TABLE IV.
Primiparæ (162): Method of Infant Care in Hospital.

Group.	Actual Practice.			Preference.		
	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.
I	—	80	—	3	65	21
II	—	7	43	—	10	40
III	—	15	8	—	13	10

V show what system of infant care patients were practising in hospital and their actual preference as stated when they were interviewed.

Table IV indicates that generally the majority of primiparæ favoured that form of rooming-in which they were actually practising, although there was a swing towards day and night rooming-in among those of Group I.

The preferences of the multiparæ of Group I were similar to those of the primiparæ, whilst the multiparæ of Group II showed a pronounced swing towards day rooming-in only.

Views at the Post-Natal Clinic.

Three hundred and three of the 513 women returned to the post-natal clinic and were questioned as to their preferences with regard to rooming-in. No private patients were interviewed. Tables VI and VII show the preferences of the women at the post-natal clinic as compared with their preferences as stated when interviewed in hospital.

The only apparent change of view was among the primiparæ of Group II, who showed the slightest tendency to prefer rooming-in during the day only as against day and night.

Conclusion and Remarks.

As the figures show, the mass of patients was favourably disposed towards rooming-in, most responding to it enthusiastically. The majority of patients practised rooming-in during the day only, and in the main they said they preferred it to rooming-in day and night. However, of those who practised rooming-in day and night, the majority favoured this. In general, the reasons given by those practising rooming-in during the day only for not being in favour of rooming-in day and night were that they considered this would be too disturbing at night and too tiring, that one baby would waken another, and that patients would be disturbed by other babies crying. It

TABLE V.
Multiparæ (351): Method of Infant Care in Hospital.

Group.	Actual Practice.			Preference.			No Preference.
	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	
I	1	189	2	16	150	24	2
II	—	6	106	3	39	70	—
III	—	29	18	2	28	17	—

will be shown later that this is not so in the majority of cases in which patients are actually practising rooming-in day and night.

Some patients thought that rooming-in day and night would be acceptable in single rooms but too disturbing in wards. However, there were others who said they preferred the company of a four-bed unit to the loneliness of a single room. Some expressed a preference for night rooming-in to begin on the second night.

There were also many who said they felt better for being up and about at an earlier date, and grateful for the activity, which they considered had strengthened them in preparation for returning home, as opposed to a longer period in bed with less activity, which they considered had a weakening effect.

Points of Criticism of Rooming-In.

After the investigation had been in progress for some time, further points of criticism of the system of rooming-in were raised, and as they seemed relevant and of general interest, they were incorporated in the study to amplify existing questions. In the original *questionnaire*, the question was asked: "Do you consider your night's rest was disturbed by rooming-in?" The additional questions were: "Have you been disturbed by other babies?" and "Do you consider one baby wakes another?"

Disturbance at Night.—The general consensus of opinion among patients whose babies were rooming-in day and night was that it was not unreasonable to be wakened once, or even twice, during the night to feed one's baby.

TABLE VI.

Primiparæ (107): Preferences at the Post-Natal Clinic.

Group.	Preferences in Hospital.				Preferences at the Post-Natal Clinic.			
	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	No Preference.	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	No Preference.
I	3	51	16	—	4	50	15	1
II	—	9	28	—	—	13	24	—

This was not considered a disturbance, but accepted as natural and as no more than would be expected at home. However, continued crying and restlessness of their own or in some cases other babies was considered a disturbance.

A total of 151 clinic patients practised rooming-in day and night, of whom 42 (28%) said their rest had been seriously disturbed. Seventeen (11%) said that their rest was a little disturbed; however, they did not mind putting up with this, as they preferred rooming-in day and night. Ninety-two (61%) said that they did not consider their night's rest had been disturbed at all. Among those 42 who said that their rest had been seriously disturbed, there were 38 patients who were not in favour of rooming-in day and night, and as a result of the disturbance they would definitely not choose this in future. Three patients were not in favour of rooming-in at all, preferring nursery control; and one patient, whose baby had an infection which necessitated constant attention, felt that in normal circumstances rooming-in day and night would not be too disturbing.

A total of 26 private patients practised rooming-in day and night. Of these, eight said that their night's rest had been seriously disturbed; three said that their rest had been a little disturbed, but it was worth putting up with it because they preferred rooming-in day and night; and fifteen said that they did not consider their rest had been disturbed at all. All patients in the group who said that their rest had been seriously disturbed said they would not choose rooming-in day and night again. Thus there was a slightly greater proportion of private patients than of clinic patients who considered that their night's rest had been disturbed.

In answer to the question, "Have you been disturbed by other babies?", no private patients admitted this. Of the clinic patients, 26% said they had been disturbed, but they went on to explain that it was not so much the crying of the other babies which had disturbed them as the general activity of other patients attending to these babies and the turning on of lights. Others (11%) said that they had been very lightly disturbed by the crying of other babies, but realizing that they were not their own babies, had returned to sleep. They stated that they did not object to this or consider it a real disturbance. The remaining 63% denied any disturbance whatever.

In reply to the third question, "Do you consider one baby wakes another?", patients for the most part said they did not consider that this was so — namely, all private patients and 78% of clinic patients. They pointed out that, although it might be so in a nursery, it was not so with rooming-in, because there was not the same volume of noise, and babies were more accustomed to general noise and movement with rooming-in than with nursery control.

Therefore, no matter what form that type of question took, there was a constant majority who persistently denied disturbance.

Patients' main worry regarding night rooming-in was not so much concerning themselves, but the fear that their own babies would wake other patients. Whereas at home, at night, the babies would be left to cry if they failed to settle after attention, this was not possible with rooming-in. Various other views were presented, some patients saying that although they were not actually disturbed by the crying, they did not sleep as well with babies beside them, as they were anticipating their waking. However, there were many others who said that they slept better, knowing that the babies were at their bedside.

Oiling and Changing Baby.—A further point of outside criticism was that patients found oiling the babies and changing the napkins too tiring and difficult, and that this should be done by the nursing staff. This question was specifically put to 410 patients (350 clinic patients and 60 private patients)—that is: "Have you found oiling and changing your baby too tiring or difficult?" Once again, these patients were not specially selected, but were taken consecutively after the question was included in the *questionnaire*. No attempt was made to relate the different types of deliveries to the views held, as the group for study included all types of deliveries. The commencement of oiling babies and changing napkins by the patients depended on the type of deliveries and the condition of the patients, and it would be most unusual for patients to be asked to give these attentions before they were fit to do so.

Twenty-nine of the patients (7%) said that they had found oiling and changing the baby too tiring and too difficult, they did not like doing it, and they felt that it should have been done for them by the nursing staff. Forty-four (11%) said that they had not found it too tiring or difficult, but just a little awkward and uncomfortable for the first few days, moving around while still in bed and lifting the baby in and out of the cot. They felt that the nursing staff should have done the lifting for them. The remaining 337 (82%) said that they had not found oiling and changing in any way too tiring or difficult — in fact, in the main they said that they had enjoyed doing it for the babies, as they gained experience, and the activity gave them a greater interest and so helped pass the time.

When these figures are analysed and considered in the three original groups studied, it is interesting to note that the group with the smallest percentage of patients

TABLE VII.

Multiparæ (196): Preferences at Post-Natal Clinic.

Group.	Preferences in Hospital.				Preferences at Post-Natal Clinic.			
	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	No Preference.	Nursery Control.	Rooming-in During Day.	Rooming-in Day and Night.	No Preference.
I	11	106	15	1	12	106	13	2
II	3	29	31	—	5	28	30	—

who found oiling and changing too tiring and difficult was Group II (Table VIII). This can, perhaps, be related to the fact that the patients in this group were allowed up at an earlier date than those in Groups I and III.

Comments.—Most patients felt that the nursing staff gave adequate assistance and were very willing to help and advise when necessary. However, there were a few who stated that they had been neglected by the nursing staff, and their requests for assistance had been either ignored or met with impatience. This is held to be a personality factor which will always enter into human relationships, the faults being divided between patients and nursing staff. Many patients, especially those who found this activity a little awkward and uncomfortable for the first few days, thought that the cots should have movable sides, which could be let down to make lifting the babies in and out easier.

Table VIII.

Views Regarding Oiling of Babies and Changing Napkins.

Group.	Oiling and Changing Too Tiring.	Oiling and Changing Awkward but not Too Tiring.	Oiling and Changing not Too Tiring.
I	21	26	182
II	4	11	106
III	4	7	49

Incidence of Infection.

During the six months over which this study was conducted there was no serious outbreak of any infection.

For the purposes of this study, the infections which were noted were of the eye, cord, nose and skin, and these infections were recorded clinically, without any bacteriological check. The babies were studied in two groups, those rooming-in and those who were fully nursery controlled. No attempt was made to subdivide the rooming-in babies, as even in Group II all but 20 of those studied in connexion with infection were taken to the nursery for the whole or part of one or more nights. Also, all babies from all floors were removed two afternoons a week during visiting times, as it was found difficult to control visitors, who made a habit of visiting more than one patient and handling the babies.

Four hundred and eighty-four babies were studied with regard to infection, 464 rooming-in (from Groups I, II and III), and 20 nursery-managed (Group IV). One hundred and nineteen babies (26%) of the 464 rooming-in developed infection, and 14 of the 20 nursery-managed babies developed infection. The number of nursery controls was unfortunately small, but they did show a greater tendency to infection.

The most common type of infection was eye infection, which accounted for over half of the total. Cord and skin infections were the next most common, and only a minority of babies suffered from nasal infection.

The majority of the babies were not born with infection, but developed it between the second and sixth days (Table IX). This finding coincides with the bacteriological survey conducted by Plueckhahn and Banks (1958) at the Geelong and District Hospital, who stated that it was the rule for neonatal infections to develop as the days passed. Babies born with infection were exceptional.

Initial Attitude to Rooming-in and Sources of Information.

It was considered important to investigate the women's views on first hearing of the system of rooming-in and to trace the source of the information on which they based them.

The attitudes of 507 patients were studied. One hundred and twenty-four (24%) said that they had not been in favour of rooming-in when they first heard of the system, 237 (47%) said that they had thought rooming-in during the daytime only desirable, and 146 (29%) said that they had thought rooming-in day and night desirable.

From these figures it can be seen that a smaller percentage of women favoured rooming-in on their first hearing of the system (76%) than when interviewed in hospital (95%) (*vide supra*).

Women were questioned as to the source of their prior information with regard to rooming-in, and this was found to fall into five categories. These were: (i) previous experience of rooming-in at the Queen Elizabeth Hospital (in temporary section); (ii) physiotherapist; (iii) private doctor; (iv) friends; (v) no prior knowledge.

These information groups were studied to assess the effects of the source of prior information on the patients' initial attitude to rooming-in. It was found that those who had previously experienced rooming-in at this hospital and those who had been told of the system by the physiotherapist initially provided the greatest percentage in favour of rooming-in. These were followed closely by those who had no previous knowledge of the system. The two groups with the smallest percentage initially in favour of rooming-in were those who had no official information, having heard of the system from friends (over half the total women) and those who had been told by their private doctor (this latter group comprising only private patients).

Table IX.

Development of Clinical Infection.

Group.	First Day.	Second and Third Days.	Fourth to Sixth Days.	Seventh Day and Over.
Rooming-in babies	5	43	47	24
Nursery-controlled babies	5	5	1	4

Those who had been told of the system by friends complained that they had heard many conflicting, confusing and at times unfavourable reports of the system, and several had considered cancelling their bookings. The majority expressed the opinion that they should have been told officially.

The women who had no previous knowledge of the system were perhaps more fortunate than those who had heard from friends, as the former learnt of the system once they were in hospital, where they could actually see it as a working concern and had not had their attitudes coloured by other people's opinions or prejudices.

Educational Aspects of Rooming-in.

Primiparæ.

Primiparæ were questioned in hospital as to whether they felt confident about looking after their babies (feeding, handling and general care) on return home.

The majority of primiparæ could not speak highly enough of the benefits obtained from rooming-in. In most instances the mothers had no previous knowledge or experience in handling infants, and the opportunity of obtaining this under the careful guidance and tuition of competent nursing staff imbued them with confidence. They said that they were given excellent advice on and practical demonstration of infant care by the nursing staff, and could ask questions to clarify any points on which they were doubtful. Observation of, and discussion with, more experienced mothers was held to be of the greatest benefit, and it was not uncommon to find these women giving practical assistance to the inexperienced. This is one of the benefits of the four-bed ward.

The development of mothers' confidence in themselves was due to the fact that they became accustomed to handling babies and familiar with feeding habits, ways, needs and routines, and learnt to distinguish such things as a hunger cry from a pain cry. In some instances,

when the patients were practising only day rooming-in, they expressed regret that their babies were not left with them at night, as they thought they would have had added confidence on returning home had they previously become used to caring for the baby at night.

One hundred and sixty-two primiparæ, clinic and private patients, were questioned, of whom 157 said that they felt quite confident, three said they were "so-so", and two said they were not at all confident.

At the post-natal clinic, of the 107 clinic primiparæ studied, all but 12 stated that on returning home they were able to cope happily and confidently — i.e., 89%. This number included those who, when interviewed in hospital, had been doubtful of their own confidence. There was only one who said that on returning home she had been quite devoid of confidence; the other 11 had been fairly confident, but they had some difficulties and worries which added confidence could have eliminated.

There was also a small group who, although they had not been in favour of rooming-in while in hospital because they found it too tiring, admitted at the post-natal clinic that rooming-in had helped them greatly on their return home. The experience and confidence gained in hospital had relieved the strain of returning home and taking the full responsibility.

Multiparæ.

The majority of multiparæ gave very similar reasons for liking rooming-in. Even though they had previous experience they still thought that through rooming-in they had learnt more by observation and discussion, and by being able to ask questions of the nursing staff. In this case women were asked at the post-natal clinic whether they were aware of any real benefits from rooming-in. The question asked was: "Did you notice any benefits from the system of rooming-in?"

Of the total questioned, 72% said that they felt that they had more confidence on returning home with the present baby than with previous babies, and they thought that this was due to the influence of rooming-in. The remainder said that they had not noticed any marked difference with the present baby.

Analysing these figures, it is interesting to compare the opinions in parity groups: of those with two babies, 78% claimed greater confidence; of those with three babies, 68%; of those with four babies, 65%; of those with five and more babies, 73%. These figures tend to contradict the generally expressed views that the greater the parity, the less acceptable is the rooming-in system — showing, as they do, that a greater percentage of multiparæ with five babies and more claimed benefits than those with three and four babies.

Psychological Aspects of Rooming-In.

The psychological aspects are the least easily demonstrable and can be gathered only from the patients' own statements of their feelings on the subject.

Apart from the practical advantages, those in favour of rooming-in gave various reasons why they felt they benefited from the system.

The general opinion was that it was the natural thing for mothers to have their own babies with them and that they were thus happier and more contented. While they were in hospital, with none of the cares and worries of running a household, they were able to devote more time to the enjoyment of the babies. The constant companionship in a relaxed atmosphere was held by many to be conducive to the establishment of a greater bond between mothers and babies, many patients stating that they felt greater affection for the present baby than for previous babies.

In many instances patients welcomed the company of the babies as a relief from boredom, stating that it gave them an interest which occupied their time and stopped them from thinking about themselves. This interest and the feeling of independence given by rooming-in were held by many to be responsible for their better mental and physical condition, and many remarked that they had not experienced the post-natal depression which they had had with previous babies and were not so tired with the present baby as with the last, believing the interest and activity to be responsible. As a result, the tendency was for patients not to regard themselves as "sick" and in need of special care and attention, but to look upon childbirth as a natural function and a time in which to prepare themselves gradually for their return home.

An outstanding point made by the majority of patients, multiparæ from their past experience and primiparæ from their own observations, was that rooming-in eliminated the distressing separation of nursery control.

Another aspect, held by patients to be important, was that the fathers were able to see and become familiar with the babies in a way that was not possible with nursery control. This heightened the woman's own pleasure and enabled husband and wife to enjoy the experience together. The benefits thus extended to the family unit as a whole.

There were some patients who, although not in favour of rooming-in because they found it too tiring, acknowledged these benefits. However, the remainder of those not in favour considered that rooming-in was too distressing and disturbing, and too much worry and responsibility for them while they were in hospital. There were also a few who were of the opinion that, as they were paying to be looked after, they should not be asked to care for the babies themselves.

Discussion.

This study has endeavoured to arrive at some factual evidence on the two questions of demand feeding and rooming-in of babies with their mothers. It has been found impossible, for reasons of space, to incorporate all the subjective material collected in this study.

The method of neonatal management that is adopted will depend upon the views of those responsible and upon the circumstances and facilities prevailing. Hard-and-fast rules are usually best avoided, and as far as possible each mother and baby should be treated individually to suit the desires of the mother, her temperament, the social circumstances and the many other relevant factors surrounding the pair. The success or otherwise of such schemes to introduce the home environment into the maternity unit by letting the healthy mother care for her own baby will depend upon the desire for success by those in charge, and the full understanding of the system by the prospective mother. Nursing staffs are often divided in their opinions, although it seems that where four-bed units are available, and where a calm and efficient supervision is maintained, there can actually be more free time for the individual members of the nursing staff on their tour of duty. There is no doubt that the natural system of management provides the mothers with so much confidence that the majority return home well trained and without fear of their ability to manage their babies.

It is hoped that the findings presented may facilitate the decision as to the best management to be adopted in this present staphylococcal era. They are the results of the study in this particular hospital over this particular period, from late winter through the spring and summer seasons. It is hoped that this report will be followed by the findings of others, particularly from Australian and New Zealand centres.

Summary.

1. A social study of rooming-in and different feeding methods is reported from the Queen Elizabeth Hospital, Adelaide.

2. Five hundred and thirteen women formed the basis of this study.

3. Of babies who were demand fed and roomed-in day and night, 60% regained their birth weight by the seventh day.

4. Of babies on demand feeding in the daytime and nursery control at night, 35% regained their birth weight by the seventh day.

5. The lower the birth weight (premature infants excluded), the greater was the tendency to regain the birth weight by the seventh day irrespective of the feeding schedule.

6. More women practised demand feeding six weeks after delivery than during the first week.

7. Routine-fed babies dispensed with the night feed earlier than did the demand-fed babies.

8. Of the women in the study, 95% were in favour of rooming-in when interviewed in hospital.

9. Views on discharge from hospital showed little change at the six-weeks post-confinement visit.

10. Approximately 60% of private and clinic patients, rooming-in day and night, denied any disturbance at night.

11. Of the women, 82% denied that caring for their own baby was in any way too tiring or difficult.

12. Of the 20 fully nursery-managed babies, 14 developed some clinical infection compared with 119 of the 464 rooming-in with the mother.

13. The majority of infections developed between the second and sixth days.

14. There is a lack of official information given to women on rooming-in methods, and the need for this is stressed.

15. Of primiparæ interviewed at the post-natal clinic six weeks after the birth, 89% stated that they had returned home with confidence and were well educated to care for their baby.

16. Of multiparæ questioned at the post-natal clinic, 72% stated they had greater confidence with the roomed-in baby than with previous babies.

17. There was less post-natal depression when mothers had their babies beside them.

18. Fathers preferred rooming-in of the babies.

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REFERENCE.

PLUECKHAHN, V. D., and BANKS, J. (1958), "The Ubiquitous Staphylococcus", MED. J. AUST., 1: 664.

EXTENDED RADICAL SURGERY IN THE TREATMENT OF CARCINOMA OF THE BREAST.[1]

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IN any discussion of the treatment of breast cancer, it is worth recalling that the average duration of life of an untreated patient is three and a half years from the time of onset of the disease. Accordingly, much of the statistical evidence of the efficacy of treatment based on five-year survival rates must be viewed with caution; this applies particularly to the relation between the prognosis and the anatomical site of the primary tumour in the breast.

In 1951 Park and Lees made a statistical study to show that radical mastectomy did little to alter the life expectancy of patients with carcinoma of the breast; this was later refuted in 1952 by Doll, who carefully analysed these same figures. More recently McWhirter (1955) has claimed a slightly higher survival rate of patients with tumours in the inner half of the breast over those with tumours in the outer half, when treated by simple mastectomy and radiotherapy, and suggests that radiotherapy is a more adequate mode of treating metastasis in the internal mammary nodes than those in the axillary nodes. This increased survival rate of patients with medial growth differs from the observations of other workers, who have found a considerable increase in the mortality rate in this group.

The lymphatic spread of cancer from the breast has always determined our mode of surgical treatment. The work of R. S. Handley and others has drawn attention to the importance of the internal mammary nodes in the lymphatic drainage, and Handley has suggested that these nodes may be the route of spread to the lungs, pleura and liver. Handley's (1952) review of the lymphatic spread in 119 cases of breast cancer is set out in Table I. This shows that from the start, in 34% of these cases, radical mastectomy is doomed to fail in completely excising all malignant tissue. When considered in relation to the site of the primary tumour, the operation is inadequate for approximately 60% of medial quadrant growths and for approximately 20% of lateral quadrant growths. These figures have been confirmed, with minor variations, by other workers, notably Wyatt, Sugarbaker and Stenton (1955) in the United States. This pathological proof has led to a new consideration for the surgical therapy of breast cancer.

A more aggressive approach by the surgeon was suggested as long ago as 1898 by Halsted, writing in the *Annals of Surgery*:

> Dr. H. W. Cushing, my house surgeon, has in three instances cleared out the anterior mediastinum on one side for recurrent cancer. It is very likely, I think, we shall in the near future remove the mediastinal contents at some of our primary operations.

However, not until 1951 did Wangensteen and Lewis introduce their super-radical operation, in which there was a combined resection of the internal mammary, mediastinal and supraclavicular lymph nodes in continuity with radical mastectomy—an operation associated with a high mortality rate and now abandoned.

In 1952, J. A. Urban, of the Memorial Center for Cancer in New York, introduced his operation of resection of the internal mammary nodes in continuity with radical mastectomy, and it is this operation I wish to discuss at length in a few minutes. Other more drastic operations have been suggested, such as combined radical mastectomy and interscapulo-thoracic amputation by Dr. Prudente for certain fixed tumours; but one would hardly expect this to become a popular routine procedure.

On the other side of the picture, some workers have abandoned radical mastectomy and joined the McWhirter school of simple mastectomy and radiotherapy, whilst between the two points of view, Dr. Haagensen, of the Presbyterian Hospital in New York, has tried to establish a method of first taking an excisional biopsy of an internal mammary node, and proceeding with radical mastectomy only if this is not invaded when examined histologically by the frozen section technique.

It is worth remembering that after a well-performed radical mastectomy, one rarely sees a recurrence in the axilla. This suggests that surgical excision is a very effective method of treating lymphatic metastasis. On the other hand, 15% to 20% of patients develop recurrences in the chest wall.

Also, R. S. Handley in 1952 has shown that after radiotherapy to lymph nodes, viable cancer cells may be

[1] Part of a surgical seminar on carcinoma of the breast, held at the Royal North Shore Hospital of Sydney on March 10, 1958.

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demonstrated centrally in some of the nodes. Admittedly these cells are firmly imprisoned by a dense fibrous-tissue barrier; but it is a disquieting feature. Even Dr. McWhirter has never shown or claimed sterilization of lymph nodes by irradiation.

The most effective method of treating lymphatic metastasis is by surgical incision, and accordingly I support the use of the Urban operation in selected cases. A routine skin incision is used, and the skin flaps are elevated in the usual manner. The axillary dissection is then carried out either before or after a wedge resection of half of the sternum and the second to fifth costal cartilages, together with the internal mammary vessels and nodes in continuity with the breast and pectoral muscles. The nodes, incidentally, are found adhering to the back of the sternum by a fascial sheath. Urban opens the pleura in all cases; but in a high proportion of operations an extrapleural dissection is possible. The defect in the thoracic cage is closed by a fascia lata graft (preferably from the deep-freeze bank, as this avoids another scar on the patient), and an intercostal drain is used in those cases in which the pleura is opened or its integrity is in doubt. This extended operation adds about one hour in operating time, and no doubt does increase the mortality to a small extent. Its value is not yet established stastistically, and we shall have to wait until after 1962 for this answer. However, it is based on sound pathological data.

TABLE I.

Lymphatic Drainage of the Breast in Carcinoma.
(*After* R. S. Handley 1952.)

Half of Breast Involved.	Number of Cases.	All Nodes Free.	Lymph Nodes Invaded.			Radical Mastectomy Inadequate.
			Axillary Only.	Internal Mammary Only.	Both.	
Inner ..	45	10	8	3	24	27 (60%)
Outer ..	74	28	32	1	13	14 (19%)
Total	119	38	40	4	37 (31%)	41 (34%)

The selection of patients upon whom Urban's operation should be performed is the crucial problem, and it is very difficult to be dogmatic. At the moment there is no sure way of knowing whether the internal mammary nodes are invaded by cancer, and it would seem that Dr. Haagensen's method of biopsy gives many false results. When Handley's figures are considered, if these are grouped according to clinical stage as well as to the site of the growth (Table II), and if it is assumed that the clinical staging is in complete accord with pathological findings, then the growths situated in the medial quadrants, or behind the nipple, will produce metastases in the internal mammary nodes in 23% of Stage I lesions and in 75% of Stage II growths. This should form the basis of the surgeon's decision. The extended operation is advocated in all cases of clinical Stage II growths in the medial quadrant of the breast or behind the nipple, in the knowledge that three-quarters of these patients will have internal mammary node involvement. In Stage I growths in a similar situation, because a routine radical mastectomy would adequately deal with three-quarters of these, the extended operation is recommended only if one's clinical impression of the behaviour of the lesion leads one to suspect early lymphatic metastasis. A similar argument applies to Stage II outer quadrant growths.

As time goes on, we shall get a better idea of the type of case in which the extended operation should be performed; but I think the approach I have outlined is at least designed to do the best for the majority of patients in each category.

Certainly, surgeons can no longer complacently rely on radical mastectomy for the treatment of all types of cancer of the breast, irrespective of its site or stage, and turn their backs on the invasion of the internal mammary nodes, relying on the radiotherapist to take care of these.

At the moment I am very reluctant to abandon the chase and join the rather pessimistic school of McWhirter. The argument of increased morbidity following the extended operation is not valid, because after all the internal mammary nodes have to be dealt with somehow, and pulmonary fibrosis frequently follows irradiation of this area.

TABLE II.

Involvement of Internal Mammary Nodes in Relation to the Clinical Staging of Cases of Cancer.
(*After* R. S. Handley, 1952).[1]

Half of Breast.	Stage I.		Stage II.		Total.
	Number of Cases.	Internal Mammary Nodes Invaded.	Number of Cases.	Internal Mammary Nodes Invaded.	
Inner	13	3	32	24	45
Outer	29	1	45	13	74
Total ..	42	—	77	—	119

[1] This table assumes complete accuracy in assessing node involvement.

A suggested plan for treatment of cancer of the female breast is as follows:

Stage I: Radical mastectomy, post-operative radiotherapy to chest wall.

Stage II:

1. Outer quadrant growths; Radical mastectomy, post-operative radiotherapy to chest wall and supraclavicular nodes.
2. Inner quadrant growths: Radical mastectomy with internal mammary node dissection, post-operative radiotherapy to chest wall and supraclavicular nodes.

Stage III: Radiotherapy to primary tumour and lymphatic drainage; sometimes toilet mastectomy; hormonal therapy in some cases.

Stage IV: Radiotherapy; hormonal therapy, which includes medication, oophorectomy, adrenalectomy or hypophysectomy.

Irradiation to the axilla is never recommended after radical mastectomy, and irradiation of the supra-clavicular nodes is carried out only if the axillary nodes are invaded by carcinoma proven histologically.

There are two other types of extended operations worth mentioning. Some years ago Dr. Foote and Dr. Stewart, of the Memorial Center for Cancer, stated that "the most frequent precancerous lesion of the breast is a cancer of the opposite breast". In more specific terms, it is known that of the patients who survive for years after treatment of cancer of the breast, 8% will develop cancer of the other breast. It seems appropriate to mention, at this stage, that there has been a suggestion in favour of performing bilateral mastectomy as the primary mode of treatment of breast cancer. Suffice it to say that this has not had a popular appeal to either surgeons or their unfortunate patients.

The combination of prophylactic castration and radical mastectomy has been suggested as an extended form of operative therapy, although, of course, castration may be performed surgically, by radiotherapy or by administration of large doses of testosterone; but there has been no evidence that this in any way alters the behaviour of the disease, apart from the so-called inflammatory type of cancer of pregnancy.

It must be stressed that hormonal therapy is still only a palliative form of treatment no matter how complicated it becomes—I refer particularly to adrenalectomy and hypophysectomy—and it should never be used as an excuse for inadequate surgical methods.

The outcome of the treatment of cancer of the breast, as in most other types of cancer, depends to a great extent on the efficacy and radical nature of the first operation. It is for this reason, with the pathological data at our disposal in mind, that an extension of our present accepted surgical methods is advocated in those types of lesion which have already been discussed.

References.

HANDLEY, R. S. (1952), "Further Observations on Internal Mammary Lymph Chain in Carcinoma of the Breast", *Proc. Roy. Soc. Med.*, 45: 565.

McWHIRTER, R. (1955), "Simple Mastectomy and Radiotherapy in the Treatment of Breast Cancer", *Brit. J. Radiol.*, 28: 128.

PARK, W. W., and LEES, J. C. (1951), "The Absolute Curability of Cancer of the Breast", *Surg., Gynec. Obstet.*, 93: 129.

URBAN, J. A. (1952), "Radical Mastectomy in Continuity with En Bloc Resection of Internal Mammary Lymph Node Chain; New Procedure for Primary Operable Cancer of the Breast", *Cancer*, 5: 992.

WYATT, J. P., SUGARBAKER, E. D., and STANTON, M. F. (1955), "Involvement of Internal Mammary Lymph Nodes in Carcinoma of the Breast", *Amer. J. Path.*, 31: 143.

PSEUDOMONAS PYOCYANEA DISSEMINATED FROM AN AIR-COOLING APPARATUS.

By KEVIN ANDERSON,

From the Institute of Medical and Veterinary Science, Frome Road, Adelaide.

THE discovery that *Pseudomonas pyocyanea* was being projected into the air of an operating theatre from a particular type of cooling apparatus draws attention to the dangers of any system which operates on the principle of water evaporation for temperature reduction in hot, dry climates.

A request was received to check an air-cooling plant installed in an operating theatre. No cases of sepsis had been recorded, but the proximity of the air stream to an operating table had given rise to concern. Inspection of the machine showed it to consist of a wall installation comprised of a rotating drum covered with porous material, which, at its most dependent point, dipped into a trough of water. This was kept at a constant level from the main supply by means of a standard ball-cock valve. An electric fan sucked outside air through the drum and into the room, cooling taking place by evaporation as the drum rotated. A blood agar plate was held in the air stream, approximately three feet from the apparatus, and was exposed for three minutes. After overnight incubation, the plate yielded a profuse growth of *Ps. pyocyanea*. The hospital was immediately informed, and the unit disconnected. The trough containing water was exposed, and samples were taken for bacteriological examination. The specimens were turbid and yellow in colour, and fluoresced strongly in ultra-violet light. Pour-plates showed that 0·1 ml. of water contained uncountable colonies of the organism, while direct plating of the water yielded a heavy growth of *Ps. pyocyanea*.

Steps were taken to clean out the water trough and to replace the contents with a solution of chlorhexidine, 1: 2000 in sterile water. The solution was also poured over the drum, so as to impregnate thoroughly the porous material, after which the apparatus was allowed to remain undisturbed overnight. Subsequent water samples and air samples were proved to be free from the contaminating organism. It was recommended that chlorhexidine be periodically added to the trough, and samples submitted for bacteriological examination to exclude the presence of pathogenic microorganisms.

Summary.

Ps. pyocyanea was cultured from air passing through a cooling unit, which operated on the water evaporation principle.

The organism was traced to the water trough, which was heavily contaminated.

Attention is drawn to the possible dangers of this type of apparatus, and to the need for regular examination of the water reservoir and the addition, if necessary, of some bactericidal solution.

DELAYED MUSTARD GAS KERATITIS: A REPORT OF FIVE CASES TREATED BY LAMELLAR KERATOPLASTY.

By R. HERTZBERG, F.R.A.C.S.,

Sydney.

ONE of the most unpleasant effects of the 1914-1918 war was the appearance of the delayed effects of mustard gas on the eyes—delayed mustard gas keratitis. Usually, on discharge from the army, there had been no visual disability; with the passage of the years the effects of exposure to the noxious agent appeared. The psychological effect of this delayed reaction with its attendant pain, misery and loss of vision is very great.

Up to 1947, 243 cases of delayed mustard gas keratitis had been reported. Scholz and Woods (1947) collected and reviewed 136 cases. The clinical pattern is fairly constant. There is a history of a long interval since exposure followed by repeated ulceration and fluctuating and slowly deteriorating vision. The exacerbation is accompanied by severe photophobia, lachrymation, pain and diminished visual acuity. The conjunctiva is congested except at the intrapalpebral fissure, where adjacent to the limbus there are porcelain white ischæmic areas surrounded by dilated veins. The ulcers which form are irregular in shape and depth and follow no definite pattern. The clinical course is one of remission and exacerbation.

The cause of relapsing mustard gas keratitis is not definitely known. Scholz and Woods discuss these factors, which may be enumerated: tissue sensitivity, destruction of mucous glands, corneal anæsthesia, vascular abnormalities, cholesterol crystals and loosening of corneal epithelium.

Until recent years treatment had been symptomatic—padding the eye, atropine, antibiotics, tarsorrhaphy and contact lens; finally, in some cases, enucleation had to be resorted to. Both Scholz and Woods and Mann (1955) mention that lamellar keratoplasty may be of value in these cases.

To date no series of cases treated by lamellar keratoplasty has been reported. Macindoe (1955) mentions the use of this procedure in one patient, with the relief of pain. In discussing Macindoe's paper, Mann mentioned that she collected 92 patients with gas keratitis in England, but could not find anyone to perform lamellar keratoplasty. These cases can be difficult technically, as the cornea is very irregular in thickness, and from the patient's and surgeon's point of view most disappointing, as improvement in vision cannot be assured. However, freedom from pain can be promised, and for this reason keratoplasty is worthwhile attempting.

Since September, 1957, five patients with delayed mustard gas keratitis have been treated by lamellar keratoplasty at the Repatriation General Hospital, Concord. All patients had the typical history of loss of vision, which appeared years after exposure to the gas. All were despondent and unhappy men; the lives of four of these patients were ones of frequent visits to hospital for treatment of delayed mustard gas keratitis. Any treatment which promised some hope of relief was eagerly grasped by each man. The effect on the morale of these patients has been remarkable.

CASE I.—The patient, aged 64 years, was first seen in 1954. During 1955 and 1956 he had been in and out of hospital for

treatment of recurrent keratitis. In 1957, prior to operation, both cornea were grossly facetted, and there was opacification and some vascularization. The vision was "count fingers at one foot" in the right eye, and "hand movements" in the left eye. On September 18, 1957, a seven millimetre lamellar graft was performed on the left eye. In January, 1958, the vision in the left eye was 6/60.

Case II.—The patient, aged 63 years, had been first seen in 1948 with a history of failing vision for twelve years. Since 1948 he had been in and out of hospital. In September, 1957, both corneæ were staining, and the eyes were irritable. The vision in each eye was recorded as "less than 6/60". On September 23, 1957, a seven millimetre lamellar graft was performed on the right eye. In April, 1958, the vision in the right eye was 6/24, and the patient requested that the other eye be treated.

Case III.—The patient, aged 68 years, had a history of failing vision in the left eye since 1921, and in the right eye since 1941. In 1952 vision in the right eye was 6/12 and in the left eye was 6/36. In 1957 the vision had deteriorated to 3/60 and "count fingers at one foot" respectively. On October 21, 1957, a seven millimetre lamellar graft was performed on the right eye. On February 17, 1958, the vision in the right eye was 6/60 correcting to 6/36, and he could read J.7.

Case IV.—The patient, aged 60 years, had been first seen in 1938, when the vision in the right eye was 6/9 and in the left eye was 6/6. By 1957 the vision had deteriorated to less than 6/60 in each eye. On October 23, 1957, a seven millimetre lamellar graft was performed on the left eye. On March 13, 1958, the vision in this eye was 6/24 with correction.

Case V.—The patient, aged 61 years, had 3/60 vision in each eye when seen in January, 1958—the result of delayed mustard gas keratitis. On February 10, 1958, a seven millimetre lamellar graft was performed on the right eye. On April 22, 1958, the vision in the right eye was 6/60, correcting to 6/36.

Summary.

Delayed mustard gas keratitis is briefly reviewed. Five patients with delayed mustard gas keratitis were treated by lamellar keratoplasty, with relief of symptoms and improvement in vision in all cases.

Acknowledgements.

I wish to pay tribute to the patients who submitted to operation without promise of visual improvement. Thanks are due to Sisters O'Shea and Bennett for the nursing care, and to Dr. C. Burnside who supervised the post-operative care. Dr. N. M. Macindoe has been a source of encouragement, without which these cases may not have been attempted. Finally, I thank the chairman of the Repatriation Commission for permission to publish these cases.

References.

Macindoe, N. M. (1955), "Lamellar Grafting", *Trans. ophthal. Soc. Aust.*, 15: 171.

Mann, I. (1955), in discussion of paper by N. M. Macindoe, *loco citato*.

Scholz, M., and Woods, A. C. (1947), "Relapsing and Chronic Ocular Lesions Following Mustard Gas Burns", *Arch. Ophthal. (Chicago)*, 37: 139.

Reports of Cases.

BEE STING THROUGH THE CORNEA.

By S. J. Goddard,
Albury, N.S.W.

Insect stings involving the eyelids are not rare, and fortunately the eyeball is spared in the majority of these cases. Occasionally the eye has been penetrated to a varying extent. Quite recently Law has described horizontal scratches on the cornea after a bee-sting had been removed from the upper lid. At least ten other cases have been reported in which the sting has penetrated cornea or sclera with a variety of complications—abscess, iritis, recurrent corneal erosions, secondary glaucoma, dystrophic keratitis and a chronic inflammation similar to ophthalmia nodosum. In other cases cataract has developed, either as a direct result of the sting retained in the lens, or secondarily to the chronic endophthalmitis.

Clinical Record.

One evening in autumn, a young man, aged 16 years, was referred because his doctor could see a sting in the cornea of the right eye and had already removed a piece of what looked like insect wing from the lower fornix. The lad had been "scrambling" on a motor cycle in a paddock known to contain several bee-hives when he felt something impinge on his right eye, and sudden excruciating pain developed. Both lids and the bulbar conjunctiva were intensely œdematous. Under the loupe the sting was seen to lie centrally and vertically in the cornea, and examination of a cross-section under the slit-lamp microscope showed it running obliquely through the whole thickness of the cornea from below upwards, with about one-fifth of its length jutting into the anterior chamber. The immediately surrounding cornea was extremely cloudy through all layers, there was a milky exudate about the wound, and the whole appearance resembled a corneal abscess.

An attempted removal of the sting was unsuccessful, as the foreign body was too fine to allow any grip to be obtained with forceps, and it was decided to leave it *in situ* and treat the eye along medical lines. Initially the patient had atropine drops instilled and received "Chloromycetin" locally and systemically; in addition the administration of an antihistamine ("Phenergan") was commenced. On the fifth day the keratitis looked severe, and 30,000,000 units of T.A.B. were given intravenously and "Oculentum Chlorocort" was instilled four times a day, the latter being continued for one month. Shortly afterwards the eye began to settle, but it took four weeks for the process to become quiescent. When the patient was examined three months after the incident, the vision in the affected eye was 6/6. The sting had now migrated, and was lying vertically on the back of the cornea, close to the original puncture wound. There was dense scarring of the cornea below this, and fortunately beneath the pupil.

Discussion.

The case illustrates the initial stages in the management of a bee-sting left in the eye. The possible methods of its removal are under direct slit-lamp observation if any of the sting protrudes from the surface, and by suitable operative methods if the sting remains inside. In the first instance it is reasonable to make the attempt, although the maximum diameter of the shaft is less than one-twentieth of a millimetre. In the second category, a method described by Truman Davis could be used: a lamellar flap is turned back and a trephine plug, including the foreign material, is removed. The long-range prognosis of these stings is uncertain, and it is debatable whether drastic methods should be used to remove them. Strebel watched a case in which the eye was quiet after 21 years; others have reported exacerbations after varying intervals.

Riek has done interesting work on the morphology and mechanism of the sting. The stings are about 2·2 mm. long and 0·045 mm. in diameter in the centre; each has two saws and a dorsal sheath compressed to form a hollow tube along which the venom passes. At the moment of impact, the two saws move in one after the other by delicate muscle movement and hold their position by some 10 recurved barbs, whilst the toxin is injected simultaneously. The nature of the saws and barbs may explain why the stings can remain for years in the upper eyelid, and eventually pass through the lid to involve the cornea or sclera. In this respect, it is worth recalling that caterpillar hairs frequently have a barbed mechanism, and these hairs are notorious for the manner in which they penetrate the eyeball and produce the clinical picture of ophthalmia nodosum.

The toxin is a protein, which has been isolated by electrophoretic separation, and has been found to cause increased vascular permeability and to paralyse certain smooth-muscle preparations such as the guinea-pig ileum. Piffko described a case of corneal bee-sting associated with

facial paralysis, so the venom may carry a neurotoxic component as well.

In most cases reported the stings are considered to have penetrated through the upper lid and to have pierced the eyeball at a later date; indeed, one would expect this from the protective mechanism afforded by the lids. However, I believe from the way in which the injury was sustained, and from the appearances shortly afterwards, that this was a direct penetration of the cornea, and the œdema of the eyelids was secondary to the diffusion of toxin from the wound.

Summary.

The events following the direct sting of the bee on the cornea are described, and the management and mechanism of the sting are discussed.

Acknowledgements.

I am indebted to Dr. R. K. Stevenson for the opportunity of reporting this case, to Mr. K. Myers and Mr. Edgar Riek of the Commonwealth Scientific and Industrial Research Organization for their help and original work on the bee-sting, and to the librarian at the Victorian Eye and Ear Hospital for the translation of certain references.

References.

DAVIS, C. T. (1958), "Removing Foreign Material from the Cornea", *Amer. J. Ophthal.*, 45: 569.
DUKE-ELDER, S. (1954), "Text Book of Ophthalmology", 6: 6769.
LAW, F. (1958), "Insect Sting of the Lid—and a Sequel", *Brit. J. Ophth.*, 42: 314.
PUYKO, P. (1957), "Bee-sting in the Cornea", *Szemeszet*, 94: 42.
RIEK, E. (1958), unpublished communication.

ANGIOMA OF THE VAGINA: A RARE CAUSE OF HÆMORRHAGE.

By OSCAR RYCHTER,
Sydney.

VAGINAL HÆMORRHAGE has well-defined causes, namely, vaginitis, laceration, carcinoma and trauma (ulceration caused by a pessary); however, no mention is made of angioma as a cause of bleeding in any of the recognized textbooks of pathology or of gynæcology. Angiomas are tumours composed of newly formed vessels, which may display pronounced neoplastic tendencies, and are markedly influenced by mechanical pressure of the circulation—a factor absent in other tumours.

Rokitansky and others believed that many angiomas represented simple hypertrophy of vascular segments without neoplastic overgrowth. According to Ewing, angiomas formed as a result of venous stasis or of unusual demands for nutrition. Thoma believed that angiomas were formed by the double mechanism of loss of support to vessel walls in the surrounding tissue, tending to excite formation of vascular new growth, and of the increase of blood flow, favouring elongation and dilatation of the walls. Local irritation was the main cause of angioma formation (Virchow). However, in general, most of these tumours are of congenital origin.

Clinical Record.

Mrs. A., aged 32 years, was seen on December 11, 1957. Menarche had occurred at the age of 12 years and previous menstrual cycles had been normal. Her last menstrual period was on October 23. Routine general examination revealed no abnormalities, except large varicose veins of the lower extremities, which had appeared in the preceding few weeks. On vaginal examination, the vagina was normal and the uterus was enlarged to about six weeks' pregnancy.

On March 3, 1958, she noticed a slight post-coital vaginal bleeding, which lasted for over an hour. She was quite well until March 7, when sexual intercourse was followed immediately by a severe and persistent hæmorrhage; this was checked by the patient herself applying pressure to the vulva with the help of a towel. With a mirror in her hand she saw a longish "piece of skin" protruding from the vulva. She became somewhat panicky, but felt no pain. She was brought to the surgery soon after. On examination considerable varicose hypertrophy of the vulva and vagina was noticed. A cylindrical, highly vascular, bluish, distally-necrotic growth was seen protruding from the introitus, which originated from the anterior vaginal wall at a point one-third of an inch above the urethral meatus; it was one and a half inches long by one-quarter of an inch wide, and cylindrical in shape. The uterus was enlarged to about 20 weeks' pregnancy; the fœtal heart sounds were present.

Under local infiltration anæsthesia the growth was removed by cautery at its base and the patient returned home unassisted.

Subsequent examination of the specimen at the Board of Health Laboratory gave the diagnosis of hæmangioma.

In the following months marital relationships have resulted in no bleeding whatsoever.

After prolonged and difficult labour, caused by posterior presentation and resultant uterine inertia, the patient was safely delivered of a baby girl with the aid of forceps on August 9. When she was examined six weeks after, there was total absence of varicosities in the genital region.

Comments.

There are only two recorded cases of vaginal hæmangioma in the United Kingdom. In one case (Briggs, 1922-1923), a young primigravida noticed protrusion through the vaginal orifice of a cylindrical angioma, one and three-quarter inches long. However, in this case there was no abnormal varicosity of vulval, vaginal or other veins, and no local injury or hæmorrhage. In the second case (Curtis, 1920-1921), a woman, aged 32 years, noticed the protrusion of a vaginal angioma, which appeared a few days before each menstrual period for some months until it was spontaneously expelled. However, in this case the patient was not pregnant, there was no hæmorrhage, and the tumour was presumed to have appeared after a heavy weight was lifted.

Careful inquiries and perusal of available literature establish the case under discussion as the only one known of vaginal angioma with hæmorrhage published in this country. It also establishes pregnancy and local irritation as factors in the formation and hæmorrhaging of these tumours.

Acknowledgements.

I wish to thank Miss M. Rolleston, of the library of the N.S.W. Branch of the B.M.A., for her long and arduous search of medical publications, and Sir Herbert Schlink for his courteous assistance.

References.

BRIGGS, H. (1922-1923), "Angioma of the Vaginal Wall", *Proc. roy. Soc. Med.*, 16: 61.
CURTIS, H. (1920-1921), "Angioma Spontaneously Evacuated from the Vagina", *Proc. roy. Soc. Med.*, 14: 319.
EWING, J. (1940), "Neoplastic Diseases", 4th Edition, Saunders, Philadelphia.
MACLEOD, D. H., and READ, C. D. (1955), "Gynæcology", Churchill, London.
WILLIS, R. A. (1953), "Pathology of Tumours", 2nd Edition, Butterworth, London.

Notes on Books.

Directory of Services for the Aged. Melbourne, 1958. Sponsored and published by the Lions Club of Richmond, Victoria. Melbourne: Mason, Firth and McCutcheon Proprietary, Limited. 8¼" × 6¼".

IN 1957 the citizens of Richmond, Victoria, formed a branch of the Lions Club, and adopted as their community project a study of the problems of elderly people in the district, from which a service programme might be developed.

With great good sense, in order not to duplicate existing services, the group sought the advice of Dr. J. S. Collings, of the Clarke-Hiskins Medical Centre, Richmond, on what the Lions Club could best do. It was finally decided as a preliminary measure to survey the services already in operation, and set them out in a directory. The actual work of compiling the details for the directory has been done by a social worker, Mrs. M. Dewdney, under the auspices of the Lions Club in Richmond.

The directory is an admirable production. In it is to be found all manner of information relating to amenities for elderly folk, not in Richmond alone, but in the whole city of Melbourne; naturally, the emphasis is on Richmond. In his introduction, Dr. Collings expresses the hope that other communities will undertake similar investigations. The directory is presented in a strong, loose-leaf form, so that additions and amendments will be easy. It is admirably indexed, and interleaved with stiff cardboard sheets projecting beyond the pages; each projection bears, in heavy black type, the title of the following section. It should prove a valuable supplement to other lists already in existence, and should be of material assistance to medical practitioners, social workers and others who are constantly confronted with the problem of how to deal with elderly people in need of help.

Nomenclature of Fungi Pathogenic to Man and Animals: Names Recommended for Use in Great Britain. Medical Research Council Memorandum, No. 23 (revised edition, 1958). Her Majesty's Stationery Office. 9¼" × 6", pp. 16. Price: 1s. 5d. (English).

This useful pamphlet sets out the correct nomenclature of the commoner fungi recorded as pathogenic to man and animals and of the diseases which they cause, as decided by the Medical Mycology Committee of the Medical Research Council of the Privy Council. It may therefore be accepted as the standard authority on these matters by anyone who wishes to conform to British practice. Where necessary, a brief discussion is included giving the reason for the nomenclature adopted. Most medical writers are aware that the organism formerly referred to as *Monilia albicans* is now correctly known as *Candida albicans*, though the disease caused by it is still generally called moniliasis. The Committee have now adopted candidiasis as the correct term to refer to this condition, but they note that the decision was not unanimous, and the term moniliasis is retained as a synonym. This pamphlet should be referred to by anyone writing about the fungi parasitic on man and animals or the diseases which they cause.

Immunisation Information for International Travel. Prepared by the Epidemiology and Immunization Branch Division of Foreign Quarantine of the Bureau of Medical Services, United States Public Health Service. Washington: U.S. Department of Health, Education and Welfare, Public Health Service. 6" × 4½", pp. 72. Price: 30 cents.

This little booklet is issued by the United States Department of Health, Education and Welfare Public Health Service as a guide for United States citizens travelling overseas, and contains a useful summary of immunization requirements applying to travellers entering and leaving the various countries of the world. Section I is a short discourse on the documents and immunization required. Section II is a list of immunizations recommended, with brief comments. Section IV gives the United States immunization requirements in detail. Section V sets out a complete list of countries with the immunizations required and recommended by each. Only three diseases are generally designated: nearly all countries require visitors to be in possession of an international certificate of vaccination against smallpox, either universally, or only if they come from an infected area; many countries require evidence of immunization against yellow fever and cholera if the visitor has come from an infected area within five or six days (i.e., this regulation applies mainly to air travellers in most instances). This last requirement is made more extensive than it sounds by the fact that yellow fever is now considered to be endemic throughout virtually the whole of tropical Africa, and a substantial part of tropical South America. Section VI is a list of designated yellow fever vaccination centres in the United States, where vaccination against yellow fever can be obtained only at these centres. Section VII gives a summary of the health regulations concerning the importation or re-entry of pets. Altogether this is a useful little guide to the immunization requirements of the intending international traveller; though some sections refer particularly to United States regulations, much of the information is equally useful to the taveller of any nationality.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Physiotherapy in Obstetrics and Gynecology (Including Education for Childbirth)", by Helen Heardman; revised by Maria Ebner, M.C.S.P., with a foreword by W. C. W. Nixon, M.D., F.R.C.S., F.R.C.O.G., and Veronica Shand, S.R.N., S.C.M., M.T.D.; Second Edition; 1959. Edinburgh and London: E. and S. Livingstone, Limited. 8¼" × 5¼", pp. 266, with 97 illustrations. Price: 20s. (English).

The author was killed shortly after the publication of the first edition, and the revision has been undertaken by a fellow physiotherapist.

"Cyclopropane Anesthesia", by Benjamin Howard Robbins, B.A., M.S., M.D.; Second Edition; 1958. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 8¼" × 5¼", pp. 308, with 74 illustrations. Price: 90s.

The first edition was published 18 years ago. This edition brings the subject up to date.

"The Practice of Sanitation", by Edward Scott Hopkins and Wilmer Henry Schulze; Third Edition; 1958. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" × 5¾", pp. 498, with 141 illustrations. Price: 88s.

The authors describe this as a guide in environmental sanitation for the training of physicians qualifying as health officers, sanitarians, nurses and students in sanitary engineering.

"Nutrition and Atherosclerosis", by Louis N. Katz, M.D., Jeremiah Stamler, M.D., and Ruth Pick, M.D.; 1958. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9" × 5¼", pp. 146, with 66 illustrations. Price: 55s.

An expanded review and appraisal of the subject based on a lecture given in 1956.

"Physiology of Spinal Anesthesia", by Nicholas M. Greene, B.S., M.A., M.D., with a foreword by John Gillies, C.V.O., M.C., F.R.C.P.E.; 1958. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" × 5¼", pp. 208, with illustrations. Price: 66s.

"This monograph is an attempt to review and evaluate all reports which appear in the literature dealing with the physiological response to spinal anesthesia or to surgery being performed under spinal anesthesia."

"The Nursing and Management of Skin Diseases", by D. S. Wilkinson, M.D., M.R.C.P.; 1958. London: Faber and Faber. 8¼" × 5¼", pp. 288, with many illustrations. Price: 32s. (English).

Intended as a supplement to the usual books on diagnosis and treatment of skin diseases.

"Womanhood", by Margaret Moore White, M.D., F.R.C.S., F.R.C.O.G., wtih a foreword by Professor W. C. W. Nixon; 1958. London: Delisle, Limited. 8¼" × 5¼", pp. 144, with 40 illustrations. Price: 17s. 6d. (English).

Writen for women with the aim of helping them to understand some of the problems, human and medical, which they encounter in their daily life as young women, wives and mothers.

"Advances in Tuberculosis Research", edited by H. Birkhäuser, H. Block and G. Canetti; 1958. Basel and New York: S. Karger. 9¼" × 6¼", pp. 350, with 69 figures and 30 tables. Price: sFr. 64.

Contains seven contributions, the authors coming from six different countries. Five are written in English, one each in German and French.

"Training for Health Education in the South Pacific", by Morven S. Brown; 1958. New Caledonia: South Pacific Commission. 10" × 8", pp. 72, with three tables. Price not stated.

An account of a training course in health education for South Pacific Health and Education Workers held in Noumea, July-August, 1957.

The Medical Journal of Australia

SATURDAY, APRIL 18, 1959.

THE STUDENT HEALTH SERVICE.

THE University of Sydney has appointed a full-time Director of Student Health Service within the University, the appointment being, we believe, the first of its kind to be made in Australia. In announcing the appointment the Vice-Chancellor and Principal of the University, Emeritus Professor S. H. Roberts, said that the Senate of the University had for some time been giving serious consideration to the need for the setting up of a student health service, the primary purpose of which would be to provide free initial advice on health problems of students and to provide also for on-the-spot treatment in emergency. Such a type of service had in recent years become common practice in the universities of the United States and Great Britain and had been recommended for Australian universities by the Murray Committee. Professor Roberts pointed out that the Students' Representative Council had prepared a detailed report for the consideration of the Senate and had laid particular emphasis on the problem of the mental health of the student and the need for professional advice in the particular circumstances which faced a university student during his course.

This action of the University of Sydney is a matter for congratulation, and it is to be hoped that it will be copied by other Australian universities, in some of which, at least, a good deal of thought has already gone into the subject. It is of particular interest to note that the man appointed by the University of Sydney, Dr. Nicolas Malleson, is thoroughly experienced in this field, and has written a number of thoughtful papers on the basis of his experience. Well qualified medically, he has been physician in charge of the Student Health Service at University College, London, for some years. Some might have wished that an Australian had been appointed, but presumably experienced men in this field were not forthcoming locally. Since student health services are by no means new in the United Kingdom, it seems only sensible to have chosen someone who knows at first hand the lessons learnt there in a hard way. Moreover, Dr. Malleson is still young, and so should be able to adapt to the needs of Australian students his knowledge and experience in what is quite a specialized field. No doubt the students will quickly point it out if the service is not satisfactory. As Professor Roberts has made clear, a good deal of the initiative in this move came from the Students' Representative Council. Its report, which was prepared by two medical students in consultation with interested members of the academic staff, is a credit to the authors and, following on the relevant recommendations of the Murray Report, may be said to have stated very effectively the case for a student health service with a full-time physician in charge. The case has been well supported by investigations carried out in the University of Melbourne by the Student Counsellor there, Mr. R. R. Priestley, and perhaps we may hope to hear soon of a student health service in Melbourne.

How the service in the University of Sydney will develop in detail will probably depend largely on the assessment of the situation made by the newly appointed director on his arrival, and on the results of his consultations with the University authorities. Many factors will have to be considered. It would be foolish not to profit to the fullest extent from the long experience of such services in the United Kingdom, where the first student health unit was opened in the University of Edinburgh in 1931. On the other hand the background of social welfare and medical practice is different in Australia, where there is a wise reluctance to yield too freely to the blandishments of the Welfare State. Perhaps only two main points need be made to avoid certain obvious possibilities of misunderstanding. The first, which is recognized and accepted in the Students' Representative Council report, is that the service should not supersede the functions of the student's own doctor, or interfere in the student's right of choice of medical adviser, either general practitioner or specialist. This should present no serious difficulties. The second point, to be balanced against this, is that student health is a specialized field, and many of its problems are best handled in the environment of the university by those with first-hand detailed knowledge of that environment. With the best will in the world the ordinary general practitioner, out of touch with current university life, and with his own student days receding into the past, may not grasp their full significance, or know how best to reach their solution; nor indeed in many cases has he the time to spend on them that they may require. Those who feel inclined to dispute this point are advised to consider the experience to date of student health services in the United Kingdom as set out in chapter XV of the Report of the British Ministry of Health for 1956, or, better, in the article by Nicolas Malleson on "The Ecological Concept in the Student Health Service" in a book reviewed in these columns on January 3 of this year.[1] It is clear from the facts and conclusions presented that those who have concentrated on this aspect of medical practice for some years are only now beginning to get it into perspective. Initial concepts and aims have had to be changed, sometimes radically, in the light of experience. Malleson shows that the functions of a student health service as originally conceived, those "of promoting physical fitness and of preventing and even treating specific disease", although capable of limited

[1] "The Matrix of Medicine: Some Social Aspects of Medical Practice", edited by Nicolas Malleson, 1958, Pitman Medical Publishing Company Ltd., London.

realization and of course desirable in themselves, are no longer the most important services that a student health centre can render to its university. "It is in giving help, support and advice to students as they adapt themselves to the physical and mental changes of growing up and to the requirements of intensive study, that we in fact find our most unique and irreplaceable rôle." The change is "from an ancillary service concerned primarily with disease to one integrated with the university life as a whole". This is surely a most desirable change of emphasis. Anyone who is in close contact with students, or who can look back clearly to his own student days without rose-coloured spectacles, must be aware of the heavy and sometimes intolerable stresses that can accompany a university course, and of how little they may be understood, even by the most sympathetic people, outside the student's immediate academic environment. Even the casual onlooker is aware of the heavy failure rate amongst present-day students, to which such stresses must contribute in no small degree. If a student health service can help to eliminate even some of the waste involved, it will more than pay for itself, whether in terms of public money, academic achievement or simple human happiness.

Current Comment.

ASPIRIN AND THE GASTRO-INTESTINAL TRACT.

It is probable that more aspirin is consumed by man than any other drug; indeed, it has been stated that 4000 million tablets are consumed annually in Great Britain. Aspirin must then be relatively harmless, but there is abundant evidence to show that it is not always entirely harmless. Gastric symptoms, from mild dyspepsia to severe hæmorrhages, have been found not uncommonly to follow the ingestion of aspirin tablets. Aspirin tablets have been modified in various ways—soluble aspirin, aspirin with alkalis or buffers, and enteric-coated tablets—in attempts to prevent the gastric symptoms. Many have been the claims that one or other of these preparations is an improvement on plain aspirin, but the evidence submitted is not very satisfactory. In an editorial in the *British Medical Journal*[1] the evidence is thoroughly reviewed, and certain conclusions are drawn. The first is that aspirin tablets should be kept away from moisture and that aspirin should not be dispensed in aqueous mixture. Secondly, the tablets should be fabricated so that there is a fine dispersion on disintegration. Thirdly, aspirin should never be taken on an empty stomach. It is not considered that any of the special preparations has any advantage over plain aspirin if this is finely dispersed.

The milder forms of gastro-intestinal upset are not of any great importance, but evidence has been put forward that in cases of gastric or duodenal ulcer the taking of aspirin, especially in large doses, may be followed by massive gastro-intestinal bleeding. A. S. Alvarez and W. H. Summerskill[2] examined the relation between bleeding and aspirin intake in 131 patients admitted to the department of gastro-enterology of the Central Middlesex Hospital with hæmatemesis and/or melæna. Eighteen patients were excluded because of the nature of their disease. The remaining 103 patients were considered to have acute or chronic peptic ulceration. A control group of 103 patients from the out-patient department with gastro-intestinal symptoms but no hæmorrhage was also examined. Of those in the hæmorrhage group 55 had taken salicylates during the 72 hours prior to the occurrence of hæmorrhage, whereas 17 of those in the control group had consumed the drug within 72 hours of attending hospital. The 24 hours immediately before the occurrence of hæmorrhage appeared particularly important. Forty-nine of the 103 patients had taken a salicylate preparation during this time, while only seven of the control group had. Alvarez and Summerskill consider that their studies indicate that salicylates play a part in the pathogenesis of massive gastro-intestinal bleeding, and that consumption of the drug could have accounted for hæmatemesis or melæna in nearly half of the patients studied. It is to be noted that 80% of the patients with major hæmorrhage after salicylate consumption had proved duodenal or chronic gastric ulcers, or dyspeptic histories. Alvarez and Summerskill remark that certain actions of salicylates closely resemble those of adrenal cortical drugs, and dyspepsia with peptic ulcer breakdown is considered a hazard of steroid therapy.

This paper has provoked lively correspondence. A. Allibone and F. J. Flint[3] do not agree with Alvarez and Summerskill in all their claims. They examined a similar series of patients, but instead of using dyspeptics as controls they used patients in states of acute surgical emergency; these, they admit, may have had a higher rate of aspirin ingestion because of pain associated with their conditions. They state that salicylates could be an important cause of gastro-intestinal bleeding but probably only in the so-called acute ulcer group. J. S. Davis[4] also criticizes the claims of Alvarez and Summerskill. He objects to their controls and asks if it is not possible that the use of a salicylate was merely an incident in the patient's response to the psychological stress associated with entering hospital. Alvarez and Summerskill,[5] in reply to the two letters quoted, express their belief "that hospital patients with acute abdominal emergencies . . . are unsuitable [as controls] because pain from the primary complaint might lead to excessive salicylate consumption, whereas gastro-intestinal hæmorrhage is a painless condition".

While the evidence is very strong that there may be a causal relationship in certain cases between aspirin ingestion and massive gastro-intestinal hæmorrhage in cases of ulcer, a remark of Allibone and Flint seems pertinent: "It is difficult to understand why, in a country where nearly 4000 million tablets are consumed annually, massive hæmorrhage due to aspirin should be a relative rarity. It would be only reasonable to suppose that aspirin causes massive hæmorrhage only in combination with other ætiological factors which are yet unknown."

MALNUTRITION IN UNDERPRIVILEGED COMMUNITIES.

The Joint FAO/WHO Expert Committee on Nutrition is still, with its subsidiary committees and workers in the field, carrying out very useful investigations on the subject of malnutrition in underprivileged communities throughout the world. They have recently published their first report.[6] Much of the work done by previous committees has been reviewed and extended, and it is clear that there are few of the poorer communities of the world who are not getting invaluable help. Work in the field of food planning and consumption has been expanded, so that information is rapidly becoming available to enable useful help to be given. Assistance to governments in planning and developing school feeding programmes still is an important aspect of the work.

[1] *B.M.J.*, 1959, 1: 349 (February 7).
[2] *Lancet*, 1958, 2: 920 (November 1).
[3] *Lancet*, 1958, 2: 1121 (November 22).
[4] *Lancet*, 1958, 2: 1121 (November 22).
[5] *Lancet*, 1958, 2: 1333 (December 20).
[6] "Joint FAO/WHO Expert Committee on Nutrition: Fifth Report", World Health Organization Technical Report Series, No. 149; 1958. Geneva: World Health Organization. 9½" x 6¼", pp. 55. Price: 3s. 6d.

In relation to supplementary feeding, where there are shortages, the committee has paid particular attention to protein malnutrition and preventive measures. Improvement in the production and consumption of food and promotion of greater diversification of agriculture are an essential part of FAO's total programme. Still more immediate aid is needed in the development and application of preventive measures, which include the effective use of protein-rich foods, other than milk, in the supplementary feeding of infants and children, and this is proceeding at the present time. A variety of factors have to be taken into account in different areas—socio-economic and cultural among others. Many countries have now been at least partially examined. For example, acceptability tests of fish flour have been made in various countries of Latin America, Africa and South and East Asia. The Rockefeller Foundation made a grant of $250,000 for research in this field, and this supports workers in 11 different countries. UNICEF gave $100,000 to buy food products needed for the investigations. Certain criteria have been found necessary for the selection of protein-rich foods, other than milk, suitable for inclusion in this programme. There are six of these, covering all aspects of availability, taste properties, transportability and keeping properties, lack of toxicity and nutritive value with respect to protein. On the basis of these criteria six protein sources are now being studied. There are: fish flour, soya bean products, peanut flour, sesame flour, cottonseed flour and coconut. With regard to the last four of these, low-fat presscakes produced by the vegetable oil industry present a useful and cheap source. These products are being produced under local conditions and studied for their biological value and safety. When everything is clear, the food is made available to research groups in underdeveloped areas for study of its effects in preventing and curing protein malnutrition when given as a supplement to various types of diet. Sometimes combinations are used. The next step is to study the possibilities of manufacturing the product for local consumption in the area concerned. Some very striking results have been obtained, especially in South America. It is recognized that such foods alone cannot solve, on a long-term basis, the problem of meeting the protein requirements of the vulnerable groups, but they can be expected to make an important contribution to an extensive and difficult problem. The ultimate aim is to teach mothers to feed their children adequately by giving them sufficient foods of the right kind. But the foods must be available in adequate amounts, and here the responsibility goes to the agricultural services and so to the national food policy of the country. These investigations on protein-rich food and its productions are being continued. The committee now objects to the term "high protein food", for the quality of the protein provided in the supplement, rather than the total protein content, is important. Food which cannot be called "high protein" may be very valuable if enough is taken.

Another subject of continued study by the committee is beriberi. There is already ample evidence that beriberi can be eradicated even in the rice-eating countries. The recommendations for this include the following: general improvement of the diet, using parboiled rice, improved method of cooking, rice enrichment and the greater use of synthetic thiamin in various ways. The preferences of the people make for great difficulties in the introduction of most of these recommendation. The committee considers that the wider use of thiamin in various forms is likely to produce the most rapid results. Pellagra also is still an important disease in many parts of the world, and the committee points out that much more work is required to produce adequate measures to control and prevent this condition.

The relation of nutrition to anæmia has been studied extensively by the committee and its investigators. Malnutrition underlies most of the anæmias occurring in underdeveloped and tropical areas of the world. The high rates of maternal mortality in some countries—for example, Mauritius—are unquestionably influenced by the prevalence of anæmia. It leads, too, to loss of working capacity and hence economic loss. The "iron deficiency" type of anæmia is the commonest. Much remains yet to be investigated, and a fresh assessment of iron requirements under varying conditions of life, in particular in tropical regions, seems to be indicated.

A great deal of work is being done on the nutritional disorders of the eye, particularly those associated with avitaminosis A. Permanent blindness occurs in many countries as a result of avitaminosis A in infancy or early childhood. Deficiency of vitamin A in the diet is common in parts of South-East Asia, Latin America and Africa, and various measures are being investigated to combat this. It has been considered desirable in some places to enrich skim milk powder with vitamin A for mothers and young children.

Other aspects of diet and disease are also being studied—for example, diet and atherosclerosis, education and training in nutrition, nutrition in maternal and child health programmes, and calcium intake and strontium 90. It will be seen that much valuable work is being done in improving the diets of people in the more backward countries, and much is being learnt which will be of value in the wealthier countries.

THE RELATION BETWEEN FAT INTAKE AND SERUM CHOLESTEROL LEVEL.

MUCH has been written during the past few years on the relation between the ingestion of saturated and unsaturated fatty acids and the incidence of hypercholesterolæmia and, by inference, on the causation of atherosclerosis. That the giving of fats containing a high percentage of fatty acids with two or more double bonds brings about a reduction in the serum cholesterol content seems to be well established. A number of investigators have claimed that saturated fatty acids raise the blood cholesterol level and are important in the production of atherosclerosis. Unsaturated fatty acids are "good", saturated fatty acids "bad". This is practically equivalent to saying that animal fats are dangerous and that certain vegetable fats are very helpful.

Not all investigators agree with these claims. One of the latest studies has been made at Harvard University by S. A. Hashim, R. E. Clancy, D. M. Hegsted and F. J. Stare[1]. They studied 12 persons with hypercholesterolæmia on a formula diet containing, as the source of fat during the experimental periods, safflower oil or a mixture of equal parts of safflower oil and coconut oil. The safflower oil was very rich in linoleic acid, while the coconut oil contained almost none. Half of the subjects took safflower oil for two or three weeks, while the other half took the mixture; then the oils were changed for another two weeks. The determinations of the cholesterol content of the blood before the experimental period and at the end of each period showed that either safflower oil or the mixture caused a marked decrease in the serum cholesterol levels, and it was approximately to the same extent in each case. Indeed, the mixture of oils caused a slightly greater decrease.

These results are not compatible with the generalizations proposed by Ahrens *et alii*, Keys *et alii* and other workers. The results are also not compatible with the belief that the linoleic acid content of an oil is proportional to its lowering effects upon serum cholesterol. Other workers have found that ingestion of hydrogenated fats, which contain little or no linoleic acid, does not invariably result in a rise in the serum cholesterol level. It is not clear why such diverse results have been obtained in different laboratories, but obviously much more work requires to be done on the factors controlling the cholesterol content of the blood. The results suggest caution against too ready an acceptance of the belief that the "saturated" fats are "bad" and the essential fatty acids "good".

[1] *Amer. J. Clin. Nut.*, 1959, 7: 30 (January-February).

Abstracts from Medical Literature.

DERMATOLOGY.

Pruritus from Bird Mites.

M. M. Cahn and F. R. Srecher (*J. Amer. med. Ass.*, June 7, 1958) report the case of a woman who had severe pruritus and mild dermatitis caused by bird mites. The cause was found to be the northern fowl mite (*Ornithonyssus sylviarum*). A window air-conditioner harboured numerous birds' nests infested with the mite. The patient had been extensively studied and was labelled neurotic before the source of the pruritus was found. Her husband, who lived in the same room, was unaffected. It is pointed out that mites are known as a cause of dermatitis, which may be mild or severe, and that animal mites have been incriminated as vectors of certain rickettsial diseases. Bird mites have been shown to harbour some of the arbor viruses, but transmission to man has not been proved.

Benign Mucosal Pemphigoid.

E. Lortat-Jacob (*Brit. J. Derm.*, October, 1958) suggests that the name "benign mucosal pemphigoid" be substituted for "ocular pemphigus". After describing the ocular lesions he goes on to mention mucosal lesions which have been noted in association with the ocular lesions. The lesions most frequently noted are on the buccal mucosa, where they appear as transient bullæ which form relatively painless erosions. The nasal mucosa is nearly always involved. The mucosæ of pharynx and larynx are also involved with consequent atresia either by sclero-atrophy or by synechiæ. Lesions also occur in the œsophagus and on the genital mucosa, and the anal mucosa may also be involved. Cutaneous bullæ are rare, but when they occur their distribution is characteristic; areas specially involved are the centre of the face, the sides of the nose, the peri-orbital region, the periumbilical and suprapubic regions and the shaft of the penis. The general condition of the patient is good, and the prognosis for life is good except for the possibility of the development of pharyngeal or œsophageal stenosis. The author states that the various treatments tried in this disorder are in general ineffective. "Aureomycin" does not seem to have any favourable effect and sulphapyridine rarely leads to any notable improvement. Sulphones do not seem to have been tried. He states that systemic steroid therapy should be given a trial.

Impetigo.

F. F. Hellegi (*Brit. J. Clin. Pract.*, August, 1958), after discussing the clinical signs of impetigo, outlines his suggestions for treatment. Impetigo usually responds rapidly to antibiotics, but there are several reasons why these should be used with discretion. The first is that antibiotics applied locally may cause the appearance of a resistant strain of staphylococcus which may be uncontrollable if it spreads to other organs. There is also the chance that the organism is resistant already, in which case the antibiotic will be ineffective. Secondly there is the risk of sensitizing the patient to the antibiotic, so that it could not be used if at a later date he were to develop some more serious infection. This would not apply to neomycin or bacitracin, which cannot be used internally. The author uses "Steroxin" ointment (Geigy), which is really a paste and can be used on moist areas. In dryer areas he uses "Quinolor" ointment (Squibb). In very moist lesions, especially in children, he uses brilliant green 0·5%, perchlorate of mercury 0·5%, industrial spirit 99%. The crust should be removed as far as possible before applying local treatment. In treating sycosis barbæ he advises also the avoidance of antibiotics, and suggests as a first line of attack either "Quinolor" or "Steroxin" ointment applied to the skin twice a day if the patient is not working. Otherwise he can use it at night and apply zinc and copper lotion in the mornings and thus be presentable at work.

Fungous Infections of the Skin.

C. M. Ridley (*Brit. J. Clin. Pract.*, September, 1958) discusses fungous infections of the skin and their treatment. He states that the treatment of tinea versicolor with mild exfoliating agents is usually satisfactory and advises the patient to apply a 10% solution of sodium hyposulphite and then a 1% solution of acetic acid on each of four days, the whole procedure being repeated after two weeks. Most fungous infections are caused by a group of fungi known as the Dermatophytes and are generally called ringworm or tinea. The tissues involved are the epidermis, the hair and the nails. Three genera are concerned: *Trichophyton*, *Microsporum* and *Epidermophyton*. The most important species in the first genus are *T. rubrum*, *T. discoides*, *T. sulphureum*, *T. interdigitalis* and its variant *T. mentagrophytes*. In the second genus are *M. canis*, *M. audouini* and *M. gypseum*, and in the third there is only one species, *E. floccosum*. Fungi of the genus *Trichophyton* attack epidermis, hair and nails, those of *Microsporum* only epidermis and hair, and *E. floccosum* only the epidermis and nails. The final diagnosis rests upon finding the fungus in the tissue and upon growing it.

Urticaria Papulosa.

R. M. Bolam (*Brit. J. Derm.*, October, 1958) states that urticaria papulosa is usually described as an urticarial flare lasting for a few hours and then followed by a small papule which is surmounted by a vesicle. These small elements may persist in an active and irritable state for about three days and finally subside leaving a small pigmented spot. They may become crusted, hæmorrhagic or infected after scratching by the patient. An occasional larger blister may be seen. The site of the eruption on legs, thighs, body and arms is quite typical. It may last for several years. The idea that the disease is due to disorders of digestion or follows eating of certain articles of food has not been substantiated. Various authors have observed that children taken into hospital become free from their spots very quickly without treatment and do not develop any new ones as long as they remain in hospital. This suggests that the eruption is due to something in their home environment. The author states that most cases of urticaria papulosa are the result of an acquired sensitivity to the bites of certain insects, particularly fleas and bed bugs, and that the most common species of parasite incriminated is the cat flea.

Contact Dermatitis from Neomycin.

C. D. Calnan and I. Sarkony (*Brit. J. Derm.*, December, 1958) describe 14 cases of contact dermatitis from neomycin. Negative results to patch tests are frequent but the results of intradermal tests are always positive. The sensitivity is not rare and is of the usual eczematous type. The negative patch test results are due to failure of penetration of the allergen. Cross sensitivity with streptomycin has been observed, but the authors found no neomycin sensitivity in the streptomycin-sensitive patients tested. There was no evidence of an associated sensitivity reaction to bacitracin or framycetin.

The Prognosis of Localized Scleroderma.

A. C. Curtis and T. G. Jansen (*A.M.A. Arch. Derm.*, December, 1958) discuss the prognosis of localized scleroderma. Under localized scleroderma the authors include morphea, guttate morphea and linear scleroderma. The ætiology of all forms of scleroderma is unknown, hence many of the therapeutic approaches have been based on empiricism. In general a large percentage of these patients improve spontaneously, but linear scleroderma has a greater tendency towards progression and occurs primarily in the first two decades of life. The female is affected more often than the male. The authors state that certain surgical procedures are of benefit in linear scleroderma, for example subtotal parathyroidectomy.

Cicatricial Alopecia and Vitamin A.

E. Katz (*A.M.A. Arch. Derm.*, December, 1958) states that the pseudopelade of Brocq in its atrophic stage is indistinguishable from the terminal stage of cicatricial discoid lupus erythematosus or lichen planus, folliculitis decalvans and other disorders. In some of the early and progressive cases of these cicatricial alopecias marginal follicular lesions may be seen. The low fasting vitamin A values, and particularly the therapeutic result achieved with vitamin A therapy, suggest that a disturbance of vitamin A metabolism may be present in these cases. Three patients with pseudopelade of Brocq in which marginal follicular keratosis was present and one patient with Graham Little's syndrome were treated with vitamin A with the result that the progress of the disease was arrested.

Oral Leukoplakia.

D. N. Mulay and F. Vibach (*A.M.A. Arch. Derm.*, November, 1958), describe the treatment of oral leukoplakia by the local application of vitamin A. Ten patients with typical oral leukoplakia of from three months' to 10 years' duration were treated with oral troches containing 150,000 units of vitamin A. The patients

were instructed to remove their dentures and allow one troche to dissolve slowly in the mouth two or three times daily. Seven of the ten patients showed very marked improvement.

The Causes of Alopecia in Women.

E. SISI AND MME. BOURGEOIS-SPINASSE (*Presse méd.*, November 12, 1958) have investigated the most common present-day causes of alopecia in women. They state that the condition is becoming more frequent, and although it is not as a rule serious, the usual forms of treatment are not satisfactory. A precise ætiological diagnosis must first be made if possible. If alopecia following infection, operation, parturition or trauma can be ruled out, then consideration must be given first to treatment with male hormones, or to reduction of weight. Even if it is impossible to explain the mode of action, an attempt must at least be made to eliminate the cause of the loss of hair and to promote its regrowth.

Riboflavin in Psoriasis.

B. L. SCHIFF AND A. B. KERN (*A.M.A. Arch. Derm.*, November, 1958) state that rather varied results of the treatment of psoriasis with riboflavin have recently been reported. They treated a series of 90 psoriatic patients with riboflavin and found that 38% showed some improvement. They conclude that riboflavin is of little value in the management of psoriasis.

UROLOGY.

Stricture of the Ureter and Contraction of the Bladder in Tuberculosis.

W. A. MOONEN (*J. Urol.* (*Baltimore*), October, 1958) states that one of the serious factors in the course of renal tuberculosis is the tendency to scarring and contracture in the urinary pathways (usually ureter and bladder) as a result of the disease, or secondary to the healing process. The author presents 14 patients seen in the short period of three years, who, after nephrectomy and while under medical treatment, suffered damage to the normal opposite kidney because of bladder or lower ureteric disease, probably associated with healing of the disease process. The author disagrees with others who have abandoned nephrectomy and limits purely medical therapy to patients with ulcerative lesions of the calyces, possibly with small cavities. Usually double therapy with PAS and isoniazid is given. Lasting cure is sometimes observed after one year, but it may take two years. When a tuberculous pyonephrosis exists, nephrectomy is performed after brief preparation with these two drugs, and streptomycin is added to the treatment. When the cavitation is massive the medical preparation is longer. The remaining healthy kidney is often observed to become dilated owing to stenosis of its ureter at the lower end. The implantation of the ureter after excision of the stricture will restore normal renal function. Patients with contracted bladders, with or without reflux, may be markedly improved by constructing an ileal ring to enlarge the capacity of the bladder. At times, if reflux is severe, it may be advisable to implant the ureter into the ileal ring. Only absorbable catgut should be used in anastomosing the ileum to the bladder, since non-absorbable material frequently gives rise to stone formation. Another complication associated with ileo-cystoplasty and uretero-ileo-cystoplasty is the absorption of urinary electrolytes. The author states that although one might get the impression from the literature that this absorption is not significant, it is his experience that hyperchloræmic acidosis develops in about one-half of all cases during the first few weeks after operation.

Torsion of the Spermatic Cord.

C. A. MOORE (*J. Urol.* (*Baltimore*), October, 1958) states that torsion of the spermatic cord may be either intravaginal, occurring within the tunica vaginalis so that only the testis and epididymis, and not the tunica, are involved, or extravaginal, where the whole testicular mass is affected. Ten personal cases are reviewed. In four of these there was a gradual onset of mild symptoms, whereas classically the onset is sudden and the symptoms are severe. If there is any possibility of the presence of torsion, immediate exploration is indicated. When torsion is complete, infarction of the testis occurs in four hours or less. Intravenous sedation with attempted manual reduction is recommended as soon as the patient presents himself with a suggestive history or clinical findings. After such treatment bilateral orchidopexy should be done to prevent recurrence. If manual reduction fails, open operation is done at once. If the torsion is of short duration, it may be possible to untwist the cord and restore the circulation. If the condition has existed for three to four hours or more, infarction has taken place, and orchidectomy is necessary. When orchidopexy is performed to prevent future twisting the method is to attach the testis to the most dependent portion of the scrotum. All of the 10 patients reviewed by the author were between 19 and 21 years of age. When one testis had to be removed, an orchidopexy was performed on the opposite side.

Drugs in Combination for Urinary Infections.

R. D. HERROLD (*J. Urol.* (*Baltimore*), June, 1958) states that from his own practical experience, the best reason for the use of two therapeutic agents together is an infection in which both bacilli and cocci are present. Another important reason for prescribing a combination of antibiotics is to delay or prevent the emergence of resistant organisms. The classical example is the use of streptomycin with PAS and isoniazid in tuberculosis. The author states that there has been much interest recently in the phenomenon of synergism, or the potentiating effect of two drugs used concurrently so that their antibacterial action is greater than the additive effect of two agents that are synergistic. Thus against *Streptococcus fæcalis* the results are superior when streptomycin and penicillin are given together than if double the dosage of either is given alone. If *S. fæcalis* is resistant to penicillin, then erythromycin is substituted in the combination. Concurrent administration of streptomycin and chloramphenicol has in the past been found most effective against the genus *Proteus*. For the third resistant genus, *Pseudomonas*, a combination of streptomycin and tetracycline is good, but the more dangerous polymyxin may be indicated in more severe infections as a life-saving measure. The incidence of *Pseudomonas* in urinary infections is much less than that of *Proteus* and *S. fæcalis*. The author suggests that we may be entering a new era of antimicrobial therapy in which efforts will be made to increase host resistance. This may increase the effectiveness of an antimicrobial drug, provided the specific germ is known to be sensitive to it. Such potentiating antibiotic activity could concern both specific and non-specific immune substances. He states that it has recently been reported that a combination of antibiotics and gamma globulin may give an improved clinical result. Consideration is at present being given to the possibility that properdin, a newly described serum protein, is a factor in host resistance.

An Evaluation of Cystectomy.

C. C. HIGGINS (*J. Urol.* (*Baltimore*), November, 1958) summarizes an experience of 30 years with the operation of cystectomy first in the treatment of exstrophy of the bladder, secondly in papillomatosis of the bladder and finally in carcinoma of the bladder. As regards exstrophy of the bladder, 121 cases are reviewed. The author is not very impressed by attempts at reconstruction of the bladder, and thinks that cystectomy, with diversion of the urine, is the procedure of choice. In vesical papillomatosis, the procedure of choice is endoscopic fulguration or resection. However, there are rare cases of diffuse papillomatosis, often including the ureteric orifices. The author thinks that the use of cystectomy and colonic diversion of the urine is justified in such cases. He states that the treatment of carcinoma of the bladder is very controversial. He has a personal series of 129 cases in which cystectomy and ureterosigmoidostomy had been performed with or without pelvic gland dissection. In 101 of these the records and pathological findings were suitable for review. Over three-quarters of the patients were men. The average age was 55 years. Ninty-three patients were discharged from hospital in a satisfactory condition, and 8 patients died in the immediate post-operative period. Only 33% survived for five years or longer. The author states that these results have undermined his faith in cystectomy. In his experience while upper urinary tract complications of uretero-colonic anastomosis have been high, the mortality from metastases has been more important still. He believes that many of the patients in this series might have survived as long, or even longer, had more conservative surgical procedures been employed. He concludes that surgically mature judgement should be applied separately to each individual case, and that preference should usually be given to the safer procedure.

Clinico-Pathological Conferences.

A CONFERENCE AT SYDNEY HOSPITAL.

A CLINICO-PATHOLOGICAL CONFERENCE was held at Sydney Hospital on April 15, 1959. DR. NORMAN ROSE, the Medical Superintendent, was in the chair. The principal speaker was DR. JOHN E. REIMER.

Clinical History.

The patient was an unmarried female, aged 19 years, born in Milton, N.S.W., who had been admitted to hospital complaining of attacks of epigastric pain of three weeks' duration. The pain was constant during attacks, did not radiate, and usually lasted for half an hour, disappearing as quickly as it came. The pain was not related to food. When the attacks first commenced the pain had been accompanied by vomiting, but there had been no vomiting lately. Her appetite had been poor during the last few weeks. The urine had been dark for the last week. She had occasional headaches. Menstruation had always been irregular and had been absent for the last two years. There were no other symptoms. The patient had suffered from similar attacks of pain occasionally during the last nine years. The only other previous illnesses were whooping-cough and "colitis" at the age of three years. The family history was not relevant.

On examination, the patient was found to be an intelligent girl in a poor state of nutrition. Jaundice and pallor were noted. The tongue was clean and moist, the teeth were good and the fauces were normal. Situated in the epigastrium, more marked on the right than on the left side, there was a tense, tender swelling, which was dull to percussion. There was slight tenderness in the costo-vertebral angles. The liver and spleen were not palpable, and no other masses were felt.

Examination of the urine showed it to have a specific gravity of 1030, and to contain no sugar or albumin; bile was stated to be present. The pulse rate was 115 per minute. The blood pressure was not recorded. No other abnormality was noted. Special investigations showed that the red cell count was 2,600,000 per c.mm., the hæmoglobin value was 47% and the colour index was 0·9. There was evidence of red cell regeneration consistent with blood loss. The white cells numbered 5400 per c.mm., 41% being neutrophils, 55% lymphocytes, 1% eosinophils, 0·5% basophils and 2·5% monocytes. The serum gave a direct positive Van den Bergh reaction, and the serum bilirubin content was 5 mg. per 100 ml. The response to the Casoni test was negative. An X-ray examination of the chest revealed no abnormality. The diaphragm was not elevated, and there was no irregularity of its upper surface.

At the time of her admission to hospital she was free from pain, and bowel function was normal. However, on the fourth day there was an attack of severe pain towards the right side of the epigastrium, gradually increasing in intensity. Examination of the fæces showed no hooklets; occult blood was present. The temperature was 98° F. and the pulse rate 108, rising to 120 per minute. The pain persisted all next day, and frequent injections of morphine were required. On the sixth day the patient was ill and jaundiced with persisting pain, and it was noted that the cystic swelling in the epigastrium had increased in size. A blood transfusion was given, and preparation was made for operation.

Clinical Discussion.

DR. N. ROSE: There is no need to introduce Dr. Reimer to you. He has just returned from England, and we have great pleasure in welcoming him and asking him to lead the discussion on our case today.

DR. J. E. REIMER: We have under discussion this afternoon the case of a 19-year-old female patient who suffered an illness characterized by upper abdominal pain, which had been noted in attacks for nine years and was apparently worse for the last three weeks—an illness manifested by loss of weight, anæmia, jaundice and a cystic upper abdominal swelling.

Let us first analyse the history a little more closely. Pain is the main feature of the history. We are told that this pain—which characteristically came in attacks—had first commenced at the age of 10 years. It had persisted over the years, but had apparently become more troublesome, either in frequency or in severity, during the last three weeks. The pain was not colicky and did not radiate. It is, I think, reasonable to assume that the onset and disappearance of the pain were relatively sudden. This suggests a mechanical cause. We note that the attacks of pain usually lasted about 30 minutes; yet we are told that the final attacks, which brought her to operation, lasted over 40 hours. We note further that the pain is not related to food. This is perhaps disappointing if we would relate the disease to the gastro-duodenal, biliary or pancreatic apparatus, yet does not necessarily negate these viscera as being the seat of the trouble. The earlier vomiting associated with attacks of pain may be related to the severity of the pain—or to a more sinister role. Anorexia is an important symptom, and in this case I consider that the anorexia made the patient's general condition worse. Should we ascribe to the menstrual disturbance a sinister meaning? I feel not, and consider this purely a reflection of the ill health of this child. The past health is not very helpful. The pertussis we may dismiss. The "colitis"—and note the inverted commas—perhaps warrants a little more attention. Was it in fact colitis? It appears rather vague.

We note the family history is "not relevant". To my way of thinking this means one of two things: either the condition is one without known familial and hereditary influences, or only brief cursory examination of the family history has been made. If, for instance, we consider hydatid disease in this patient, it would be interesting to know whether any member of the family had any evidence of hydatid disease.

Examination revealed an intelligent girl—a point to note and perhaps of importance. It is rarely the intelligent girl who suffers from a trichobezoar. Her nutrition is poor, an indication of a long-standing disability associated with pain, vomiting and especially anorexia. She is pale, and the blood count shows she is anæmic, the comment being that the blood picture was consistent with blood loss. In addition, occult blood was present in the fæces. This suggests that bleeding from the alimentary tract, though not obvious, is the likely cause of the anæmia. Moreover, there is no evidence of blood loss from an external source; and the urine, though dark, is more likely to contain bilirubin than hæmoglobin or blood. Furthermore, the absence of menses for the past two years absolves excessive uterine bleeding as the cause of the anæmia. This leaves us the probability of chronic blood loss from the gastro-intestinal tract as the cause of the anæmia, and no doubt deficient intake also played a part.

In view of the low red cell count and the relatively high colour index, it is probable that lately there has been more marked and acute blood loss. Were more details given as to the nature and colour of the fæces, we might have been able to provide more evidence other than jaundice, that the pigment in the urine was bilirubin. The jaundice is evident on examination—that is very important. Does the patient have a hæmolytic anæmia manifested by jaundice? The attacks of pain could then be related to hæmolytic crises and the dark urine to hæmoglobinuria. Or if the hæmolysis were more chronic, there could even be pigment stones in a distended gall-bladder. In this case there would be added obstructive jaundice, and the palpable mass might be interpreted as a distended gall-bladder. The clinical picture does not fit this interpretation, but suggests only obstructive jaundice. Also the spleen is not palpable. Further evidence of positive direct Van den Bergh reaction in the serum and the presence of bile in the urine confirm that the jaundice is of an obstructive nature.

The clean, moist tongue suggests that there is no infective process, and this is supported by the relatively normal white cell count and absence of pyrexia.

We now come to the most interesting finding of the examination of our patient—a tense, tender epigastric swelling, dull to percussion, and more marked on the right than the left in the epigastrium. During the last attack the swelling, then described as cystic, increased in size. We note also that neither the liver nor the spleen was palpable. Costo-vertebral angle tenderness was noted as slight.

What, then, is this swelling? Is it a cyst, or cyst-like, and what is its pathological basis? Herein lies the crux of our case. As has often been remarked—and it cannot be too often reiterated—a correct diagnosis necessitates consideration of the probable anatomical site of the lesion and then the pathological possibilities.

What, then, is the organ of origin of this swelling? Does it arise in the liver, or biliary apparatus, or spleen, or stomach, or duodenum, or pancreas, peritoneum, mesentery, omentum, kidneys, suprarenal, colon, or blood or lymph vessels? We will consider these in more details.

We are told the liver is not palpable. We are not told some facts which would have been of great assistance in elucidating the origin of this swelling. Did it, for instance,

move on respiration? Or was it mobile? If it were attached to the liver, it would move with respiration to some degree. If it be liver, was it in the nature of a liver tumour—primary or secondary—or liver abscess, or a liver cyst? I think we may exclude hepatic neoplasm on the basis of clinical signs, except the remote possibility of a metastatic newgrowth from the primary source in the alimentary tract. If that were so, it would be occurring at an exceptionally young age. The other exceptions I might make is to entertain the possibility of hæmangioma. There is nothing to support a diagnosis of hepatic actinomycosis or amœbiasis. Cysts in the liver may be congenital, retention, neoplastic or parasitic. Of these, echinococcosis must be considered. The fact that she was born in the country raises this possibility. Other facts relevant are that the Casoni response was negative, only 54 eosinophils per cubic millimetre were present, there were no hooklets in the fæces, and the diaphragm was not elevated or irregular on its upper surface. Despite these findings, the diagnosis is not right out of consideration. However, if hydatid disease was present, and if it was intrahepatic, we would have to postulate that the pain was due to the passage of daughter cysts producing obstruction of the common bile duct with colicky pain. In this case the epigastric mass would be a distended gall-bladder. Alternatively, a pedunculated hydatid protruding from the under-surface of the liver could press upon and obstruct the common bile duct with similar results. However, as I said, I do not regard hepatic disease, including hydatid disease, as at all likely.

Is the biliary apparatus at fault? Cholelithiasis and cholecystitis, although relatively uncommon, are by no means unknown in this age group. Is this simply a case of gall-stones with recent common duct calculous obstruction and jaundice? If it were so, it would be the exception to Courvoisier's law. We should consider also a mucocele of the gall-bladder or even of one lobe of a congenitally deformed gall-bladder. Although this is not the usual age group for the condition, recurrent torsion of the gall-bladder should be mentioned. Whether the cystic swelling is cause or effect is yet to be decided; but I submit here that there is obstruction of the biliary tract, and that it is unlikely to be due to calculus. What are the other possibilities? Extra-biliary pressure, kinking, obliterative cholangitis, congenital abnormality and pancreatic or duodenal disease. But I would first like to mention some other possibilities.

Is this disease of gastro-duodenal origin? There are several possibilities. This is not an uncommon age group and sex for the condition known as hair-ball, and it is commoner than may be supposed. In this condition the mass is said to be palpable in 90% of cases, and there is a long history, particularly in adolescent girls, of recurring attacks of abdominal pain, vomiting, weight loss and blood loss. It is conceivable that jaundice could be due to the pressure of a small hair-ball in the duodenum. I feel this is most unlikely. I feel I should mention in passing the possibility of the mass being due to gastric neoplasm even with volvulus. However, although this would explain the mass, it would not explain the jaundice. Gastric carcinoma is too remote a possibility to consider seriously.

There are other lesions of the upper alimentary tract all capable of causing a mass, and some in addition producing jaundice. Duodenal diverticula, especially of the perivaterian variety, may be associated with intermittent common bile duct obstruction with pain, intestinal blood loss and a mass.

Gastric reduplication is a condition characterized by an upper abdominal cyst, which could well fill the situation; but I cannot see that it is likely that it would press on the common bile duct and cause jaundice. A duodenal enterogenous cyst, however, could also explain all these symptoms, including the blood loss, the pain, the jaundice (by pressure on the common bile duct) and the mass. People in this age group may rarely suffer from peptic ulcers, which may penetrate and perforate. If a perigastric or periduodenal abscess were formed, a tender mass might be palpable, and bleeding from the ulcer would explain the blood loss.

Megaduodenum occurs congenitally *per se* or from an obstructing lesion—e.g., annular pancreas. The resulting duodenal dilatation may give rise to a palpable cystic swelling. Jaundice is unlikely both in abscess and in megaduodenum, and I will not consider these any further.

I should now like to consider pancreatic lesions. Is this a case of pancreatic cyst—congenital, retention, parasitic, neoplasm or so-called pseudocyst? Many of the features of this illness could be related to a pancreatic cyst. The swelling is in the right site, and the jaundice could well be explained by the pressure of the cyst on the common bile duct, or by an associated pancreatitis or pancreatico-lithiasis. The pain and weight loss could also be related to a recurring pancreatitis, which has been present for some years and has eventually resulted in the presence of an epigastric swelling, a pancreatic pseudocyst or, as I would prefer to call it, a pseudo-pancreatic cyst. A cyst is defined as a closed cavity or sac of an abnormal character, usually containing morbid matter. The pseudocyst is usually a cyst and is usually extrapancreatic, and thus is better called a pseudo-pancreatic cyst. However we may term it, a pseudo-pancreatic cyst must be seriously considered in this case. It is notable that there are no tests of pancreatic function given. We are not going to dwell on the tests we might have done on this patient, because they are many and varied. However, I do not think that any tests of pancreatic function would have been helpful. One further clinical point I would mention is that the pain occurred in attacks that lasted only 30 minutes. This is not characteristic of pancreatic pain, which is usually of longer duration (10 hours or more). This is one of the diagnostic features which I think many of us would use in differentiating recurring pancreatic pain from recurring biliary pain. Pancreatic newgrowth should be mentioned, and one I might mention, because it is topical and not because I seriously consider it likely, is ulcerogenic tumour. However, an ampullary or peri-ampullary newgrowth deserves much more serious consideration, because it may produce obstructive jaundice, pain, gastro-intestinal blood loss and a distended gall-bladder. However, these growths are not commonly found in this age group. In pursuing the anatomical sites of the disease process, we look to peritoneal mesenteric or omental lesions. A consideration of possibilities in these organs would include cysts, encysted inflammatory lesions such as tuberculous peritonitis and neoplasms. These could account for the palpable swelling, but would not provide a reasonable explanation for the jaundice.

In relation to lesions of the colon, the young age of the patient leads one to consider carcinoma associated with polyposis or with ulcerative colitis and hepatic metastases, but such are readily dismissed. Similar remarks apply to retroperitoneal lesions—e.g., lipoma or liposarcoma—to lesions of the lymphatic system—e.g., lymphosarcoma and Hodgkin's disease—to lesions of the kidney, suprarenal and internal genitalia.

I should now like to restate my submission that there is obstruction of the biliary tract and that the pathological process lies in the liver, biliary tract or pancreas. Hydatid disease and pseudo-pancreatic cyst are important possibilities.

There is a condition known as choledochal cyst—but better called congenital cystic dilatation of the common bile duct—which should be considered in relation to the case. This disease presents in early life, the first symptoms usually appearing before the age of 10, 90% of the patients coming to surgery under the age of 30 and predominantly affecting (in 80%) the female sex. The characteristic clinical triad is of pain, swelling and jaundice. In 90% of cases there is a palpable cystic swelling, which is usually in the right upper quadrant and is an eccentric cystic dilatation of the common bile duct. There is usually no demonstrable organic obstruction to the lower end of the common bile duct, and the gall-bladder and hepatic ducts, which may open directly into the cystic swelling, are often not dilated. The ætiology of this condition is uncertain. The intermittent pain and jaundice are due to mechanical factors associated with distension of the sac, kinking of the common bile duct termination with subsequent release and clinical remission. The sac wall is of varying thickness, but is usually vascular and often without epithelial lining. Hæmorrhage, particularly in the presence of jaundice, is not infrequent. However, against this diagnosis is its comparative rarity. There have been only some 200 cases reported, and in a Mayo Clinic review in 20 years (1906-1926), of 17,381 operations on the biliary tract, there was only one case of this condition. Furthermore, the site of this swelling is perhaps not as far to the right as we would like.

What, then, will be the operative findings? I venture to suggest that upon opening the abdomen the surgeon will be faced with a cystic swelling in the right upper quadrant, with displacement of the duodenal loop to the medial side and the hepatic flexure downwards. On further exploration, a diagnosis of congenital cystic dilatation of the common bile duct will be made, and choledocho-jejunostomy indicated. I would not be surprised if there was gross or laboratory evidence of some infection within the sac, for this is not uncommon and may account for the terminal exacerbation in the last three weeks.

Remembering always that laparotomy is, and should be regarded as such, a final diagnostic help, I would be disappointed, but not surprised, to find hydatid or pancreatic cyst.

Dr. R. J. Walsh: I do not think it will turn out to be a hæmatological problem. Dr. Reimer has mentioned the possibility, which has occurred to those of us interested in hæmatology, that the patient may have congenital or hæmolytic anæmia. Long-continued jaundice may have produced pigment stones, and these led to the obstructive jaundice which she had. However, this is unlikely for several reasons, but I am not sure what is meant by the blood count being suggestive of "red cell regeneration consistent with blood loss". The blood count must have been repeated on many occasions, and spherocytosis has not been recorded. I think it would have been noted at least once if the patient had been suffering from congenital hæmolytic anæmia. The white cells were low, and this is unusual in hæmolysis, when there is usually a non-specific leucocytosis, called the leukæmoid reaction, and sometimes confused with leukæmia. Furthermore, the spleen was not palpable, and a history of repeated attacks of jaundice is not prominent. The cystic swelling is difficult to explain on the basis of congenital hæmolytic anæmia, and I feel from a hæmatological point of view that a surgeon must be asked to do a laparotomy.

Dr. R. M. Rawle: There seems very little to say. There does not seem to be any diagnosis which anyone could possibly put forward which Dr. Reimer has not thought of, and given sound reasons for and against. From my own point of view, I am simply left with the task of giving an opinion in the same way as Dr. Reimer. I cannot help feeling, myself, that in a young person, female, with a long history of this type, with abdominal pains, upper abdominal swelling and jaundice, that the most likely diagnosis must be surely choledochal cyst. It is, as Dr. Reimer has said, an extremely rare condition, and one hesitates to make the diagnosis, particularly as I assume that these are cases extracted from the records of this hospital, and one comes up feeling that if it is a case from Sydney Hospital it would have been reported in the literature, and as far as I am aware, I do not think it has been. I think that must be the first diagnosis to be made; the points that come then are the reason for the anæmia, which I hesitate to comment on after the comments of the physicians, and the second point is the sudden increase of symptoms for the few days prior to laparotomy. Something has obviously happened, and if we accepted our diagnosis of congenital dilatation of the common bile duct, we have to think of the possibilities which may have given rise to the more acute illness which led to laparotomy being performed. Why was this? Dr. Reimer says infection. She still did not run a temperature higher than 98° F. up to the onset of the more acute phase, which is somewhat against the concept of infection, although it does not exclude it completely. Another possibility is that, with the enlargement of the cyst, which must have apparently been quite a size from our description here, there may have been some interference with the portal circulation and the splenic circulation, and one wonders whether there may have been a thrombosis either of the superior mesenteric or splenic or portal vein. Thinking along those lines, one wonders also whether there may possibly have been some interference with splenic function, and whether this may come into the question of the anæmia. I would not say more than that.

Dr. P. H. Greenwell: I feel that the diagnosis of congenital cystic dilatation of the supraduodenal portion of the duct is the most likely one. It certainly explains all the features, with the exception of the amenorrhœa. My second choice is the possibility of cholelithiasis leading to pancreatitis with pseudo-cyst formation. The symptoms were earlier well explained by Dr. Reimer. I do not think that this is secondary ecchinococcosis, for the cyst would have to be a primary cyst in view of the information regarding the Casoni and eosinophilia. I cannot satisfactorily explain the amenorrhœa. I thought of suprarenal neoplasia in association with cystic degeneration, but I cannot visualize the anatomical considerations here, because the cyst was epigastric in position and it is hard to conceive such a cyst arising in the adrenal. Furthermore, there was no evidence of adreno-genital syndrome. So I agree with Dr. Reimer's contention that this was a congenital cystic dilatation of the common bile duct.

Dr. J. M. Yeates: I would like to congratulate Dr. Reimer on a masterly presentation. I am utterly convinced that this is a case of choledochal cyst. Although it is very rare, I think we should diagnose such a rare condition when everything fits in perfectly, and I believe it does. There are about 200 cases which have been reported, and I read some of them. Judd, from the Mayo Clinic, has reported a fair number, and Sir James Walton has reported six cases in *The British Journal of Surgery*. The present case resembles the reported cases in practically every detail, especially as regards age and sex. It is practically always a teenage girl, with intermittent jaundice. Regarding the amenorrhœa, I agree with Dr. Reimer that this is purely due to malnutrition as a result of long-standing illness. Choledochal cyst was first described in 1723 by the great Vater. Mr. Dixon Wright, who visited this hospital last year, has writen about it, and he lays down certain diagnostic criteria; there are many of them, but the main one of interest is that plain X-ray very often shows calcification in the wall of the cyst, and, secondly, a barium meal, which was not done in this case, usually shows some depression of the duodenum downwards and to the left. Sir James Walton, I think it was, tried to explain the intermittent nature of the jaundice and likened it to the flushing action of the well-known cistern. The cyst tends to be kinked with the common bile duct when it is half-full, and when full to become straight, and so the bile is discharged with temporary relief to the symptoms. I will be very surprised if this is not choledochal cyst.

Dr. J. V. L. Colman: I would like to congratulate Dr. Reimer on his very masterly discussion of this case. I was interested in the reference to "colitis", about which we are told very little. However, I wondered if this might be significant, perhaps indicating amœbiasis complicated by an amœbic abscess of the liver. I know the rarity of this condition in this country, but I did seriously consider it, and it would have been my first diagnosis. The recent acute episode in this chronic disease may have been due to the fact that this abscess was now near the surface of the liver and ready to perforate into the general peritoneal cavity. I know that the majority of amœbic abscesses are situated in the right lobe near the superior surface and more likely to penetrate via the diaphragm into the pleural cavity. These considerations make this diagnosis unlikely, but it merits some consideration in addition to the more likely diagnosis of choledochal cyst.

Dr. S. L. Spencer: I am inclined to agree with the majority of the surgical staff. I had written down here before the discussion started that it was surely a congenital cystic dilatation of the common bile duct, and I think this diagnosis is well to the front. Not expecting to get here, I have not spent the last week in the library like some people appear to have done, and therefore I am not in a position to embark upon an exhaustive discussion. I think that hydatid cyst is a distinct possibility. We are only told that this girl was born in Milton; we do not seem to have been told where she lived. I note also that we have the physical findings and progress for only four or six days before operation. I searched the protocol to determine how long the mass had been present, to consider whether it had appeared during the previous three weeks, and may have been due to abscess or hæmatoma. However, even assuming a recent onset of the cystic swelling, the clinical features would not admit either of these possibilities. Therefore, I assume the mass had been present for some time, and the likely diagnosis is congenital cystic dilatation of the common bile duct.

Dr. Alan Sharp: I think that the correct diagnosis has been made by Dr. Reimer, though I must admit that it would be hard to think of choledochal cyst, because I have never seen one. Nevertheless, the fact that the process commenced at the age of 10 years is strongly suggestive of a congenital lesion. However, there are two conditions deserving consideration. One of these, papilloma of the common bile duct, has already been mentioned by Dr. Reimer. In this case the mass would be a hæmatocele or mucocele of the gall-bladder. The other condition is an internal hernia. In this case a plain X ray and barium meal would have been most helpful. In the absence of these investigations, the fact that there was no recent vomiting is against it; but such a hernia (for example, in the foramen of Winslow) would produce a cystic mass, anæmia and a good deal of pain. However, I do agree that vomiting would be a prominent feature, and for this reason concur with Dr. Reimer's diagnosis.

Dr. B. P. Billington: Choledochal cyst is that diagnosis which explains every feature except the amenorrhœa, which I think has been passed over lightly. Choledochal cyst cannot explain this feature, and the only condition which could possibly explain it is a chronic liver disease, for example, cirrhosis with perhaps a superadded hepatoma. This seems very unlikely in the present circumstances.

Operative and Pathological Findings.

DR. DAVID FAILES: The case is taken from Sydney Hospital records 28 years ago. Operation was carried out through a right paramedian incision. A large cystic mass 19 by 9 by 5 cm. presented at the incision between the liver and stomach.

There was some free bile-stained fluid in the peritoneal cavity. The cyst was punctured, and old blood escaped with a rush. Five pints of altered blood were aspirated. The cyst was packed with gauze and drained. The diagnosis at operation was thought to be pancreatic cyst.

For the first three days after operation, the patient appeared to be progressing satisfactorily and the wound was draining bile. However, her condition deteriorated, and hæmorrhage was suspected. The wound was examined twice, and on each occasion it was considered that bleeding was occurring from the external wound, since the drainage tube contained only bile. However, in spite of control of these bleeding areas in the wound, the patient continued to deteriorate. On the ninth post-operative day, a second operation showed bleeding from the posterior wall of the cyst. At this stage the patient's condition was very low, and all that could be done was to pack the wound with gauze. She died a little later.

At post-mortem examination a small amount of clear, bile-stained fluid was found in the paracolic gutters, and there was no evidence of peritonitis. The cyst was pyriform in shape, being narrower at the top. There were three pouches: the first in the left upper portion and adherent to the common hepatic duct; the second near the gall-bladder and adherent to it and to the liver; and the third at the lower pole extended behind the pancreas, lifting the pancreas from the posterior abdominal wall. The common hepatic duct was dilated and entered the upper part of the cyst. At the inferior pole of the cyst, a probe revealed the distal part of the common bile duct as being a small calibrated duct running from the cyst into the duodenum at the ampulla of Vater. The cystic duct was slightly dilated and entered the right side of the cyst. The cyst was almost entirely lined by smooth mucous membrane, except for an area in the inferior pouch, which was eroded, filled with blood clot and appeared to be the source of the bleeding. The gall-bladder wall was slightly thickened, but its lining normal. There was hæmorrhagic effusion into the head of the pancreas, and we can only speculate as to whether this was primary or secondary.

Microscopic examination showed that the greater part of the cyst was lined by columnar epithelium typical of the biliary tree. The wall of the cyst contained muscle similar to that of the bile duct. Bile was present in the lumen. The thickness of the cyst wall, as judged from the sections, was that of the thickness of the normal bile duct. Sections from the lower pouch, thought to be the site of bleeding, showed that the epithelium was absent, and the lining consisted of granulation tissue containing larger superficial vascular spaces. These appearances confirm the diagnosis of congenital cystic dilatation of the bile duct complicated by bleeding.

Little remains to be said after Dr. Reimer's full survey of this lesion. However, there is one point I would like to stress. Although it is a rare disease, it is considered that its recognition is important because of the relation between diagnosis and result of treatment. Thus, if incorrectly diagnosed pre-operatively, the mortality is almost twice as great as in those cases in which a correct diagnosis has been made before operation. If marsupialization is performed in the mistaken belief that the lesion is a pancreatic pseudocyst, the mortality is very high. Far better results are attained when simple anastomosis of the cyst to the duodenum or perhaps jejunum is performed.

Diagnosis.

Congenital cystic dilatation of the bile duct.

British Medical Association.

VICTORIAN BRANCH: SCIENTIFIC.

A MEETING of the Victorian Branch of the B.M.A. was held on July 10, 1958, at the Department of Anatomy, University of Melbourne. The meeting took the form of a series of anatomical demonstrations by the department.

The Female Bladder.

MR. A. B. ALDER and DR. J. D. C. LYONS presented a demonstration of the female bladder. It was pointed out that in the symptomatology and surgery of the female genito-urinary system, an appreciation of the gross and detailed anatomy of the female bladder was of paramount importance. The display was designed to illustrate the anatomical basis of various conditions encountered in practice. It encompassed dissected specimens of the female pelvic viscera, emphasis being placed on the gross and detailed relations of the bladder. The relationship of the pelvic colon to the peritoneal surface of the bladder was shown in a specimen distended with glycerin. In addition, the peritoneal reflections from the bladder onto the lateral pelvic wall, uterus and rectum were illustrated.

In another specimen one saw the intimate relationship between the ureter and the uterine artery on the vaginal vault, and the superior and inferior vesical arteries supplying the bladder.

Other specimens showed the relationship of the cervix and vagina to the trigone, and the muscular and ligamentous supports of the bladder. Corresponding diagrams illustrated those features.

Histological sections through the bladder neck and urethra from a normal subject illustrated the mucosal lining, the paraurethral glands, and the neuro-muscular mechanism controlling continence of urine. Reference was made to a summary by Krantz on the last-mentioned subject.

In the applied anatomy section of the display there were X-ray cystograms and ureterograms illustrating various lesions. One showed how it was possible to mobilize the bladder and trigone from the vaginal vault and cervix, by dividing the lateral attachments and blood supply on one side of the bladder, in order to bridge a gap, after a segment of ureter had been excised, thereby preserving the ureteric orifice by end-to-end anastomosis of the ureteric stump.

Histological sections of tissue removed by transurethral resection illustrated hypertrophy of paraurethral glands and subtrigonal tissue at the bladder neck, which had caused urinary obstruction and recurrent cystitis. They were compared with normal sections.

Another dissection illustrated the relationship between cervicitis and cystitis, and it was pointed out that the histology of the urethra and its glands formed a fertile field for symptoms due to chronic urethritis.

Vesico-vaginal fistula, whether post-operative or due to neoplasm of the cervix, could be readily understood in the specimens displayed.

Finally there was a specimen to show the urethro-vesical angle and the pubo-urethral ("prostatic") ligaments, with a discussion on their relationship to stress incontinence and the methods used to deal with it surgically.

Lymphatics and Lymphangiography.

MR. A. M. BEECH and DR. J. MITCHELL presented a demonstration showing a technique developed by Professor Kinmonth, of St. Thomas's Hospital, London, to obtain radiological records of the course and type of lymphatic channels in normal and abnormal limbs. It was shown that the lymphatic channels were first made visible by the subcutaneous injection of Patent Blue (5%). The dye was taken up by the lymphatics, flow being promoted by massage and muscular movement. To demonstrate that technique and the appearance of the channels, an injection was made into an experimental animal. The lymphatics of the hind limb were clearly visible passing to the inguinal lymph nodes.

A colour photograph was shown of the appearance of injected lymphatics crossing the front of the ankle joint in man. That gave an idea of the size and appearance of those channels in a normal human limb.

X-ray films and clinical photographs were then shown to demonstrate normal lymphatic channels, single tract lymphatics and varicose lymphatics. Theories were propounded to explain the production of lymphœdema, by single-tract lymphatic channels of the aplastic type, and the association of varicose channels with congenital vascular anomalies.

Photographs were shown of conditions considered to be deep venous thrombosis and obesity, in which lymphangiography had shown definite abnormalities in the lymphatic pattern.

It was suggested that, apart from research into the anatomical pattern and distribution of lymphatics,

lymphangiography had a definite clinical application in the investigation of such cases.

The Anatomy of Parkinsonism.

MR. K. C. BRADLEY gave a demonstration which was prepared to show anatomical features of the areas to which surgery was directed, in view of the renewed interest in the surgical treatment of Parkinson's disease. The material had been obtained from formalin-fixed brains which were sectioned in three planes at right angles—horizontal, coronal and sagittal. The sections showed the lentiform nucleus and structures related to it. In particular the inner portion of the globus pallidus was demonstrated with the use of photographs of both macroscopic and microscopic sections. The macroscopic sections were surface-stained by a modification of Mulligan's method, which stained nuclear material blue, leaving the white matter unstained. The microscopic sections were selected from serial sections of frozen material and stained with a fibre-tract stain.

The various sections made it possible to see the relations of the globus pallidus to other structures, especially to the third ventricle, the foramen of Monro and the anterior commissure.

All photographs were enlargements of original specimens against which a millimetre scale had been placed, so that direct measurements of various structures could be made. In addition, X-ray films were shown from actual cases in which a needle had been introduced into the globus pallidus.

The Cervical Sympathetics.

MR. K. B. CORNWELL and DR. G. W. CROCK discussed the cervical sympathetics as the distribution of the branches of the cervical sympathetic ganglia. It was pointed out that the pre-ganglionic fibres involved in those ganglia were confined to the spinal cord between the levels of the eighth cervical segment and the ninth thoracic segment, and left the cord by their corresponding somatic nerve roots. They might synapse in the corresponding ganglion, pass up or down the sympathetic chain, or pass distally through the chain. The post-ganglionic fibres passed to the periphery via a spinal nerve, via a blood vessel, or direct to the structure to be innervated.

The mode of distribution of sympathetic fibres to the head, neck and arm, and the course of the afferent (pain) fibres from the heart were illustrated, as was the gross anatomy of the cervical sympathetic chain.

The indications for cervico-thoracic sympathectomy were tabulated, and the complications of the operation discussed in relation to the fibre tracts. It was stated that the anterior approach was the most popular one, and the anatomy of that approach and of the posterior and axillary approaches was illustrated, and their various advantages and disadvantages were tabulated.

A dissection of the root of the neck on the left side was used to demonstrate the topographical anatomy of the stellate ganglion in particular. Fascial layers were preserved as far as possible. Skin, platysma muscle and investing layer of the deep cervical fascia were reflected as one sheet. The omo-hyoid fascia was removed, but its line of attachment to the posterior aspect of the clavicle could still be seen. The most superficial vascular structures encountered belonged to the external jugular and suprascapular systems. Cutaneous nerves crossed the field obliquely as supraclavicular nerves from the cervical plexus.

The distal half of the sterno-mastoid muscle was resected, and the sterno-hyoid and sterno-thyroid muscles divided and turned medially to display the carotid sheath. The descendens cervicalis and descendens hypoglossi were shown joining at the ansa hypoglossi, from which point nerves were given off medially to the strap muscles mentioned earlier, and laterally to the inferior belly of the omo-hyoid muscle.

The scalenus anterior muscle was divided and reflected forwards near its attachment to the first rib. The three parts of the subclavian artery were thereby exposed. Running upwards from the thorax along the medial border of the subclavian artery was the thoracic duct—a pale, ribbon-like vessel. It arched laterally, reaching about 2·5 centimetres above the clavicle at its highest point, and just rested on the antero-medial aspect of the scalenus anterior insertion before passing forwards, to end in the subclavian vein. In its course the duct passed behind the carotid sheath and in front of the vertebral vein, the ansa subclavia, the thyro-cervical trunk and the phrenic nerve.

The middle cervical ganglion was small and lay in front of the inferior thyroid artery. However, several branches passed from it—laterally to the phrenic nerve and medially into the thorax and, as the ansa subclavia, to the inferior cervical ganglion.

The vertebral artery was large, and completely concealed the stellate ganglion behind it. When the artery was displaced forwards and medially, the stellate ganglion could be seen lying on the front of the neck of the first rib, in the angle (almost 90°) formed by the union of the eighth cervical and first thoracic nerves as they passed laterally to form the lower trunk of the brachial plexus, which rested on the scalenus medius muscle. The costo-cervical system of vessels formed an immediate lateral relation of the ganglion. Many quite large fibres could be seen leaving the stellate ganglion, including the vertebral nerve, which ascended along the posterior surface of the vertebral artery. There was a well-developed scalenus pleuralis muscle in the specimen. Its relation to Sibson's fascia was demonstrated.

The Foot.

MR. C. D. DONALD and DR. V. T. CHEN presented a series of dissections of the foot, to illustrate the anatomical basis of surgical disabilities.

The ankle, subtaloid and mid-tarsal joints were displayed to show their range of movement, together with the ligaments which normally supported them. The muscles acting on and stabilizing those joints for weight-bearing, locomotion and protection were shown in other specimens. Similarly the metatarso-phalangeal and interphalangeal joints were exposed to show their normal range of movement and function, along with associated disturbances of those joints. That information was of value in an interpretation of the clinical findings, and with that anatomical basis, could be of added assistance in correction of those deformities.

The place taken by bones, ligaments and plantar aponeurosis in forming the arches of the foot, and the added support given to those structures by muscles with their tendons, which played over those arches, were featured. The importance of those muscles in maintaining the individual structure of those arches in their normal anatomical position was stressed.

A specimen of pes cavus displayed the altered relations of each individual structure of the arch, with the consequent disturbed function of the foot for weight-bearing and locomotion. The plantar aponeurosis in its shortened form could be either the primary cause of that condition or a secondary effect.

Dissections of joints between metatarsals and phalanges were present, to show the effects of changes of the soft parts in hallux rigidus, hammer toe and claw toe.

The insertion of the tendo Achillis into the epiphysis of the os calcis illustrated the area from which bone could be removed after proliferation consequent on apophysitis.

Greater detail of the demonstration was clarified by the use of X-ray films and bones of the area.

Neurological Effects of Tranquillizers.

DR. C. W. DUNLOP gave a demonstration to illustrate the effects produced by two tranquillizing drugs, reserpine and chlorpromazine, on the conditioned avoidance behaviour in monkeys. The monkeys were trained to conditionally avoid an electric shock by responding to a light stimulus, and when they had been trained to a criterion of 46/50 conditioned avoidance responses, the tranquillizers were injected intramuscularly.

Graphs plotted of the conditioned avoidance reactions showed that chlorpromazine had a more rapid onset of action and a shorter duration than reserpine. Chlorpromazine produced a loss of conditioned avoidance reactions for seven hours, and exerted a maximal effect two hours after injection, while reserpine affected the conditioned avoidance reactions for 10 to 12 hours, the maximal effect occurring four hours after injection. Both drugs produced decreased activity, and reserpine also caused apathy toward external stimuli, tremor, miosis and occasionally diarrhœa.

In addition, the sites of action of the tranquillizers in the central nervous system and the neuro-hormonal changes caused by chlorpromazine and reserpine were discussed and illustrated. It was pointed out that while the depressant drugs, such as the barbiturates, exerted their greatest effects on the cerebral cortex, recent studies had indicated that the tranquillizers acted most strongly on the subcortical structures (rhinencephalon, hypothalamus, mid-brain reticular

formation), which were regarded as the anatomical substrate of emotion. Although little was known of the neurohormonal changes caused by chlorpromazine, investigations had led to the theory that reserpine acted through an indirect mechanism involving serotonin, a substance occurring naturally in the body.

Cervical Part of the Spine.

MR. W. L. ELRICK and DR. M. F. O'BRIEN presented dissections to demonstrate the normal anatomical relationships of the cervical part of the spinal cord and the cervical vertebral canal, and they were used in comparison with dissections and radiographs illustrating some of the changes seen in cervical spondylosis. Briefly the changes in spondylosis were stated to be (i) alteration of the normal convexity of the cervical part of the spine, and (ii) elevations on the anterior wall of the canal due to (*a*) disk protrusions, (*b*) ridging or "osteophytic" outgrowths at the vertebral body margins (at Luschka's joints) and (*c*) variable subluxations in both antero-posterior and/or lateral directions of a vertebra in relation to its adjacent vertebræ.

It was pointed out that the total of those changes might result in diminution below a mean of 17 millimetres in the antero-posterior diameter of the cervical part of the vertebral canal; consequent interference with the nutrition of the cervical part of the cord and myelopathy might result.

In addition to changes affecting the spinal cord, there might be alterations in the obliquity and direction of the cervical nerve roots in the intervertebral canal, and nerve root irritation might result. The nerve roots did not pass through intervertebral foramina, but actually through an intervertebral canal some three to five millimetres in length. In two specimens indentations were noted on the anterior primary rami of the second and third cervical nerves, due to a tortuous and atheromatous vertebral artery disturbing the normal but intimate relation of the two structures. It was pointed out that alteration of the vertebral artery might be a further factor causing root pain.

Abdominal Incisions.

MR. JAMES GUEST and DR. DAVID RACE presented dissections of the anterior abdominal wall to demonstrate various aspects of the surgical approach to abdominal viscera. It was pointed out that the most important factor in any incision was access. The incision should then be planned so that it did not weaken the abdominal wall, so that the skin cut would heal with minimal scarring, and so that the patient had the least possible post-operative discomfort. In practice, that meant that the anatomical components should be dealt with in the following manner. (i) In the skin, incisions should be parallel to the skin cleavage lines (of Langer). (ii) Nerves should not be divided. (iii) Muscles might be (*a*) mobilized and displaced (paramedian incision), (*b*) split in the direction of the fibres (McBurney's incision), or (*c*) cut (transverse and oblique incisions). (The repair of the incision would be stronger if the lines of incision in different layers of the abdominal wall were not superimposed, and if drainage of the peritoneal cavity was carried out through separate stab wounds.) (iv) Blood vessels required division and careful hæmostasis. The latter factor was vital to sound wound healing.

The Hand and Carpal Tunnel.

MR. N. TALBOT HAMILTON and DR. GORDON LOW gave a demonstration of dissections showing the anatomy of the hand and carpal tunnel.

Specimens of the carpal tunnel were shown depicting the flexor retinaculum itself and its attachments. It was shown that the diameter was not great and could be greatly reduced by bony deformity or soft tissue swelling.

Specimens were also shown illustrating the relations of the carpal tunnel especially to the median and ulnar nerves. The attachment of the median nerve to the under-surface of the retinaculum was clearly shown. The close proximity of the muscular branch to the thenar muscles was shown, and the danger of damaging that structure during division was emphasized.

Specimens and diagrams of the hand were shown to illustrate: (i) Langer s lines and their relation to incisions (after Bunnell). (ii) The radial and ulnar bursæ and their relation to the skin creases. (iii) The thenar and mid-palmar spaces. Those spaces were emphasized, in view of the recent increase in incidence of infections due to "resistant" organisms in them. A dissection was shown of Arnold K. Henry's approach to the mid-palmar space and the deep branch of the ulnar nerve. (iv) General hand dissections.

Fœtal Growth.

DR. J. O. LAVARACK presented a table of events in normal human development. Morphological events were listed by systems, with corresponding stages of development as defined by embryonic length, and with estimates of age. The table brought together information which was widely scattered through the literature on human development. It had been constructed with a view to study of cases of abnormal development.

Embryos in the period of organ formation were illustrated, to demonstrate that much of that development took place during the first eight weeks.

Thyroid and Parathyroid Glands and the Larynx.

MR. W. J. MCCANN and DR. L. J. CAUST showed dissections of the thyroid and parathyroid glands and the larynx. The dissections of the thyroid gland showed the surgical anatomy of thyroidectomy. The proximity of the external laryngeal nerve to the superior thyroid vessels was emphasized.

Further dissections demonstrated the relations of the inferior thyroid artery to the recurrent laryngeal nerve. The nerve in the majority of cases passed behind the artery. The extralaryngeal course of the recurrent laryngeal nerves was demonstrated right to the point where it passed behind the crico-thyroid joint deep to or through the lower border of the inferior constrictor of the pharynx.

An interesting specimen was that of the right subclavian artery arising from the beginning of the descending aorta (retro-œsophageal subclavian). In that case the right (inferior) laryngeal nerve arose from the vagus at the level of the cricoid cartilage, and passed medially to the tracheo-œsophageal groove. That aberrant right inferior laryngeal replaced the usual right recurrent laryngeal nerve in about 1% of cases, and it was thus important for the thyroidectomist to be familiar with that anomaly.

In the parathyroid gland demonstration, the light brown colour and the delicate texture were noted. It was pointed out that in 20 dissections *post mortem*, four glands had been found in eight cases, three glands in seven cases and two glands in five cases. Those findings confirmed those of larger series, in that there was an appreciable variation in the number of parathyroid glands present (two to six). That was contrary to the impression gained from many text-books, in which there was a description of two superior and two inferior glands.

The larynx was dissected to show that the movement of the cords depended upon, firstly, the shape and slope of the crico-arytenoid joint, and secondly, the attachments of the muscles to the arytenoid cartilages. The movements possible at the joint were anterior and posterior tilting and also lateral and medial movement of the arytenoid cartilages.

The Blood Supply of the Stomach.

MR. P. L. MCNEIL AND MR. G. L. GRAY demonstrated the arteries supplying the lower part of the œsophagus, the stomach and the duodenum by means of arteriograms with explanatory diagrams and a dissection. Fresh post-mortem specimens had been used for the arteriograms, so that the arteries could be fully dilated without shrinkage or hardening by formalin, and the injection medium used made branches of very small calibre easily visible. Injections were made into the œsophageal arteries via the aorta, the cœliac artery and the superior mesenteric artery.

The statement was made that the arteries to the region of the cardia of the stomach were not adequately described in the standard text-books, and the following points were demonstrated. The lower third of the œsophagus received its blood from the gastric arteries, there being no demonstrable branches of the œsophageal arteries within two inches of the diaphragm. The left gastric artery, through its ascending branch, gave the main supply to the cardia and the lower part of the œsophagus; but in the absence of that and the short gastric arteries an adequate blood supply could be maintained from three sources. The left inferior phrenic artery sometimes communicated freely with the left gastric artery, and occasionally a large accessory left gastric artery from the left hepatic artery reached that region.

Most important, however, was a constant artery not described in the text-books, which arose from the middle of the splenic artery, ascended behind the lesser sac, and joined the stomach behind the cardia. After many "total" gastrectomies, the entire blood supply to the lower part of the œsophagus and the cardia depended on that unnamed artery.

The Blood Supply of the Distal Part of the Colon.

MR. I. MCVEY and DR. D. RACE reviewed and demonstrated by dissection and injection techniques the pattern of dis-

tribution of the branches of the inferior mesenteric artery. They pointed out that that was commonly found to be (i) the left colic artery passing directly to the region of the splenic flexure and dividing a short distance from it, (ii) a number of sigmoid arteries of variable origin running to the bowel via the sigmoid mesocolon, and (iii) the superior rectal artery. The ultimate supply of the bowel was from branches of the marginal artery (the vasa recti). In contradiction to some published work, those vessels seemed to anastomose with each other to a significant extent.

The marginal artery itself formed an efficient anastomosis between superior and inferior mesenteric fields. However, it was often a relatively small vessel in the region of the splenic flexure between the two terminal branches of the left colic artery. A functional anastomosis seemed to exist between the sigmoid and superior rectal vessels via the marginal artery.

The mucosal supply of the left colon was demonstrated and shown to be well developed. The middle colic artery might be absent in as many as 20% of cases.

The following conclusions were drawn: The marginal artery formed an efficient practical supply to the left colon after high ligation of the inferior mesenteric artery on the aorta, especially if the "critical area" at the splenic flexure was "reinforced" by ligating the left colic artery proximal to its final division, and provided a prior colostomy had not affected the marginal artery on the left side. The ultimate vascularization of the colon was rich, and probably not a frequent factor in failure of anastomoses of the large bowel.

Hiatal Hernia.

MR. R. D. MARSHALL and MR. G. L. GRAY gave a demonstration of the mechanism of reflux œsophagitis in œsophageal hernia.

Evidence was presented to show that the obliquity of entry of the œsophagus into the stomach and the hiatal diaphragmatic sling were unable to prevent regurgitation. A preparation of stomach and œsophagus was displayed with a manometer connected to both the cut end of the œsophagus and the pyloric antrum. The action of the diaphragm was simulated by a metal peg pulling on the cardia. Free transmission of pressure from stomach to œsophagus occurred despite all movements of the sling mechanism.

The presence of an inferior œsophageal sphincter was demonstrated by suitably stained sections. The types of musculature of the hiatus and of the œsophageal sphincter were displayed diagrammatically, and a representative specimen was shown.

The clinical picture of hiatal hernia was discussed, and a theory of causation of symptoms based on the foregoing evidence was proposed. It was suggested that the cause of reflux was venous engorgement of the cardia and lower part of the œsophagus due to pressure on the left gastric vein by the hiatal margin. The swelling of the mucosa interfered with the efficient functioning of the inferior œsophageal sphincter and allowed reflux of gastric contents. The mucosal congestion of the lower part of the œsophagus was also a predisposing factor to the chemical inflammation of the lower end which was known as reflux œsophagitis.

The Electron Microscope.

DR. N. C. R. MERRILLEES gave a demonstration of work done with the electron microscope. He said that the first experimental models of electron microscopes had been made about twenty years previously. Ten years later a number of successful instruments were in use. Within the last few years commercial instruments had been improved, and particles as close together as 10 Ångstrom units (Å) could now be resolved as separate. An Å was one ten-thousandth of a micron. That resolution was equal to about eight atomic diameters, and is 200 times better than that of the light microscope. Techniques suitable for biological materials had been introduced about five years ago.

The demonstration of photomicrographs was designed to show what could be seen in various portions of cells. Magnifications ranged from 10,000 to 100,000 diameters. Some of the information contained in the photomicrographs was relevant to molecular structure.

In the photomicrographs of voluntary muscle shown, details of individual myofilaments and of the recurrent pattern of other components could be seen. The true relationships of motor and sensory nerves to the surface of muscle and other cells were clear; neither type of nerve penetrated the cell surface. The difference between myelinated and unmyelinated nerve fibres and some details of the nature of myelin were demonstrated. The structure of developing blood cells and of kidney was of clinical interest; the basement membrane of the kidney glomerulus was the filter; both the endothelial and the epithelial layers were discontinuous. The blood in the alveolar capillaries of the lung was seen to be separated from the alveolar space by two layers of cytoplasm; the lung capillaries had continuous walls entirely covered by an epithelial sheet. Small blood vessels showed many vesicles both at the surface and in the depths of the endothelial cytoplasm; that suggested that material might be enveloped in vesicles derived from the cell membrane for transport into or through cells.

Dr. Merrillees expressed the hope that with improvements in technique the theoretical limit of five Å of resolution might be applied to the problems of molecular anatomy in biological investigation.

The Aboriginal Skeleton.

DR. L. J. RAY gave a demonstration of the aboriginal skeleton. He said that a detailed study of the skeleton of the Australian aboriginal was possible only if a large series was available and if the bones were of known sex. Owing largely to the generosity of George Murray Black, a pastoralist of South Gippsland, the Department of Anatomy possessed a collection representative of over 800 skeletons and including over 500 skulls; 252 and 154 were known to be male and female respectively.

The demonstration included some of the features of the burial habits of the aborigines, together with a general display indicating the localities in which the graves had been found.

To illustrate the work being carried out on that material, some of the results obtained from a metrical and non-metrical survey of the clavicle were included. The results featured the great range of variation in the length of the clavicle, and also the overlap of that range between the sexes. However, the indices were more constant, and the series again emphasized the very low claviculo-humeral index, the Australian aboriginal having the lowest claviculo-humeral index recorded in man. Also displayed were specimens of coraco-clavicular joint formation, which was often stated to be excessively rare, but which was probably more common than had previously been thought.

Other specimens on display demonstrated various abnormalities of the dentition, as well as examples of ritual tooth removal, together with specimens of diseased bone found in the remains.

Multiple Epiphyses.

DR. A. F. ROCHE gave a demonstration on the subject of multiple epiphyses. He said that in 1864 Rambaud and Renault, after a careful dissection of fœtal material, described the presence of two centres of ossification in some of the cartilaginous epiphyseal areas of the hand and foot. However, that work had little influence on medical thought, and text-books of anatomy still repeated the statement that those epiphyseal areas always had single centres of ossification. In addition, some authors of articles describing clinical cases apparently considered that multiple centres of ossification in single epiphyseal areas occurred only in association with pathological states.

A survey of the radiographs taken during regular examinations of 60 normal boys and 60 normal girls by the University of Melbourne Child Growth Study indicated clearly that multiple centres of ossification were common in the epiphyseal areas of the hand and foot. They were seen most frequently in bones (such as the phalanges) which had epiphyseal areas that were flattened disks, and less commonly in those which had epiphyseal areas that were almost spherical (the second to fourth metacarpals and metatarsals). As many as eight centres of ossification had been observed in a single epiphyseal area during the investigation. In the hand and foot, such multiple foci of ossification fused into a single epiphyseal mass usually within a year of their appearance.

It was important that multiple foci of ossification in epiphyseal areas should be recognized as a common normal occurrence, so that such appearances should not confuse the diagnosis of diseases such as cretinism, osteochondritis and epiphysitis.

The History of the Microscope.

ASSOCIATE PROFESSOR K. F. RUSSELL presented a display of old microscopes. A modern replica of a Leeuwenhoek instrument (about 1665) was shown. The eighteenth century was represented by a three-pillared microscope made about

1780, but based on a much earlier pattern, also a Cuff-type instrument with compound lenses made by Dolland about 1790 from a design originally invented in 1744. The resolving power of their lens systems was shown by photomicrographs, which were compared with some taken with microscopes made after the introduction of achromatic lenses.

Other microscopes shown included some made by Kellner of Wetzlar (1855), by Ross of London (1862) (a binocular model), by Hartnack and Prazmowski of Paris (1864), by Gaunt of Melbourne (1880), by Zeiss of Jena (1881) and by Leitz of Wetzlar (1889).

Congenital Variations in the Spine.

MR. E. DURHAM SMITH presented the radiological anatomical findings in a series of children showing congenital anomalies in development of the vertebræ. The anomalies were classified into six groups. The first was failure of development of the vertebral body. The simplest anomaly was said to be fusion of adjacent bodies. However, when both the early pro-vertebral centres failed to fuse, several varieties of hemivertebræ might result. Hemivertebræ were commonest in the thoracic region, and when only one side developed the clinical result is congenital scoliosis. As the neural arch also gave rise to the rib element, a hemivertebra in the dorsal region usually carried its own rib, and might give rise to anomalies in rib number. Several complex examples of multiple hemivertebræ with rib fusions were shown. Cases of bipartite dens were demonstrated to illustrate failure of fusion. The most interesting, though rare, type of body anomaly was said to be the persistence of the neuro-central canal, which might split the vertebral body and produce an anterior spina bifida. Even a portion of hind-gut, to which the neuro-central canal was attached, could be found within the vertebral column.

The second group comprised failure of development of the neural arch. The classical deformity was said to be failure of the arch to fuse posteriorly, resulting in spina bifida. A few examples of the cervical and lumbo-sacral types were shown. Some mention was made of the diverse neurological states as found in that deformity in an analysis of over 200 children studied. Defects in the neural arch might also result in spondylolisthesis.

The third group comprised failure of development of the spinous process—the process, being developed from each side of the neural arch, might fail to fuse posteriorly. Adjacent processes might fuse with one another.

In failure of development of the transverse process, the commonest anomaly was fusion or articulation of the fifth lumbar process with the ala of the sacrum.

Referring to the fifth group, anomalies of number, Mr. Durham Smith said that the relatively common types of lumbarization and sacralization were well known; but films were shown of true increase or decrease in the number of spinal segments—e.g., eight cervical, seven lumbar, etc. Some of them were associated with hemivertebræ.

With regard to the sixth group, sacral anomalies, Mr. Durham Smith demonstrated two cases of absent sacrum, and several examples of maldeveloped sacra illustrated the wide variety of anomalies in the sacrum, such as absence of lateral masses, half sacral segments, etc. The clinical follow-up of the affected children showed the almost constant association of urinary and fæcal lack of control, suggesting failure of neural development of those sacral roots in the region of the anomaly. A dissection from a child with absence of the sacrum confirmed the complete lack of sacral nerve roots.

The Anatomy of the Painful Shoulder.

MR. W. E. SWANEY and DR. R. M. BERKLEY demonstrated some aspects of the painful shoulder. (i) The first specimen illustrated calcinosis of the rotator cuff. The mechanism of the coraco-acromial ligament in compressing the area of the cuff in the region of the supraspinatus insertion was pointed out. The effect of posture, such as lying on the shoulder, might be to constrict the cuff in that region. Areas of altered thickness of the cuff at the site would be compressed by the tight ligament. (ii) The second specimen showed tears of the rotator cuff. The small tear was shown to be pulled into a triangular shape by the tone in the muscles, with consequent bunching up of the cuff at that point. The role of the coraco-acromial ligament in compressing that bunched-up portion of cuff when the shoulder was abducted was illustrated. A complete tear of the upper part of the cuff, with retraction under the acromion and rupture of the long head of biceps, was also shown. (iii) The third specimen demonstrated excision of the outer inch of the clavicle in acromio-clavicular arthritis, the stability of the shoulder girdle being maintained by the conoid and trapezoid ligaments. (iv) The mechanism of recurrent dislocation of the shoulder was demonstrated, with the Bankhart s lesion in the anterior portion of the labrum and the depressed fracture of the posterior portion of the head of the humerus. The "hatchet head" deformity illustrated the mechanism of recurrent dislocation.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

HYDROPHOBIA.[1]

[From the *Australasian Medical Gazette*, March, 1883.]

THE fact that the Principal Medical Officer of the Government is cognisant of two cases of hydrophobia having occurred in dogs in this colony, must give rise to the most alarming apprehension in all thoughtful people. Should this terrible disease become once acclimatised in Australia it would find such a congenial soil in the number of curs—many of them ownerless—to be found everywhere, in consequence of the very defective administration of the Dog Act, that it is probable we shall have a dozen times more cases than in other countries. Until now the outcry against dogs has been, in the country districts, the ravages they commit against sheep, and in town, the danger they create by biting and barking at horses. It was to remedy these evils the Act was passed, but to what insignificance do they sink when hydrophobia becomes the prominent evil, and when by the merest scratch from the tooth of some vile cur a loved one may be consigned to a most certain and terrible death. The public interest demands immediate and rigid carrying out of the present act, and fresh legislation relating to the quarantining of imported dogs. I hear that Dr. Mackellar has pressed this on the attention of the Government of New South Wales, who are communicating with the Governments of the other colonies, with a view of immediate and united action. His energetic promptness is worthy of all praise.

The medical officer's report was not quite so definite as is implied. He stated that several cases had recently occurred in the colony which presented every symptom of true rabies in dogs. Only one confirmatory test was wanting—the inoculation and production of the disease in other animals—but before this could be done the affected animals died.

Correspondence.

TETANUS PROPHYLAXIS.

SIR: With reference to a recent article by Thomas H. Ackland on "Tetanus Prophylaxis", I wish, as a general practitioner, to state my present practice towards tetanus immunization. When presented with a break in the skin, recent or old, superficial or penetrating (including impetigo, otitis media, whitlow, etc.) the risk of tetanus infection is explained to the patient—that he has approximately a one in 250,000 chance of contracting the disease from his existing lesion (11 cases *per annum* in Victoria—population 2,700,000—assuming each person contracts one potentially tetanic lesion per year). If tetanus is contracted he would have a 40% to 60% chance of recovery. Now if an A.T.S. injection is given he has a one in 50,000 to 200,000 chance of dying of anaphylactic shock. He has a three in 100 chance of developing moderately severe urticaria[1]. After this explanation the patient usually has second thoughts about receiving an injection of A.T.S. I then advise an injection of T.P.T., explaining though giving no immediate protection, three successive injections will give a degree of life-long immunity, high if boosted

[1] From the original in the Mitchell Library, Sydney.

[1] *Canad. med. Ass. J.*, 1958, 79: 411.

at five-year intervals. Such has been my practice for the last five years, and I would be unable to follow the recommendations of Mr. Ackland till a safer and more reliable immediate immunizing agent than present A.T.S. is developed.

I have two positive sugestions in the practice of prophylaxis for tetanus.

1. The present emphasis on the use of A.T.S. is disproportionate—its use could be restricted to treatment of developed disease, and for such lesions as are highly suspect on clinical grounds (a clinical problem which apparently remains to be solved, and hence a rather futile speculation for the average practising doctor). Increased emphasis could then be placed on the wider use of T.P.T.

2. A suggestion which should appeal to the manufacturers of T.P.T.—with each ampoule of T.P.T., as well as the instructions for use now issued, a thin cardboard sheet be included, having printed on top of it the manufacturer's name and product, and printed below space for patient's name, age, date of first, second, third and booster doses of T.P.T. This could simply be filled in and handed to the patient at time of injection.

Finally, a word from N. H. Moynihan[1]: "Even if practitioners were more alert to the possibility of tetanus and gave prophylactic antitoxin more frequently it is doubtful if, in practice, the present incidence of the disease could be reduced by more than 20%".

Yours, etc.,

38 Station Place,
Sunshine,
Victoria.
March 23, 1959.

JOHN R. TAYLOR.

TROPICAL PULMONARY EOSINOPHILIA.

SIR: To clarify several points raised by Dr. B. McMillan in his letter (MED. J. AUST., January 3, 1959), the following notes are supplied in addition to my paper (MED J. AUST., December 6, 1958).

Edeson and Wharton[2] were successful in transmitting the *Wuchereria malayi* from man to different animals, e.g., monkeys and cats.

Buckley[3] in his two experiments attempted to complete the circle by trying to transmit filaria infection from naturally infected animals to man. These experiments failed to produce mature infection in the volunteer, as no microfilariæ appeared in the peripheral blood. However, as an unexpected by-product of these experiments, he observed the appearance of most of the accepted signs and symptoms of tropical pulmonary eosinophilia in his volunteer, except for the typical mottling shadows in the lung. In conclusion, while supporting a previous hypothesis brought forward by Danaraj *et alii* (1957) that T.P.E. might be caused by *Wuchereria* spp. of animal origin, Buckley states:

> This latent period might therefore be regarded as the time taken for the infective larvæ to grow to sexual maturity and to start producing microfilariæ, whereupon a substance is liberated which causes allergic response in the lungs and an eosinophilic leucocytosis; the absence of microfilariæ in the blood could be explained by their being "trapped" in the lymphatic glands as foreign invaders (as in the so-called Mayers-Konwenaar syndrome). Unfortunately, gland biopsies which might have confirmed this point were not carried out. Alternatively, it is suggested that the microfilariæ themselves are the cause of the eosinophilia leucocytosis and pulmonary effects; that having been liberated by the adult females they make their way via the lymphatics to the lungs where they remain in the perivascular lymphatic vessels and never pass from the lymphatic to the circulatory system.

I have cited this at length to prove that Buckley does not come with a new theory and that there is no contradiction between my conclusions and Buckley's. The most important fact is that we do agree on the point that microfilaria is the causative agent of T.P.E., and that it has been proved now by a controlled experiment. For the present, a few points still remain not clear:

1. Whether T.P.E. is caused by microfilaria of human or of animal origin, or by both. There is some evidence at the present that both of them might be the causative factors. However, if the microfilaria of animal origin is the actual causative factor, microfilaria of human origin might be present at the same time.

2. What is the actual mechanism through which the disease becomes itself manifest? To answer this point, there might be two possibilities (a) The true Löffler's syndrome is caused by *Ascaris* larvæ on their migration through the lungs. Besides leucocytosis and eosinophilia, there is an infiltrative process in the lung. Similarly, the presence of microfilariæ in the lung capillaries or perivascular lymphatics or lung tissues cause the typical mottling infiltration in the lungs. (*b*) Bronchial asthma is caused by allergens; no leucocytosis, eosinophilia and only coarse striation on the X-ray plate. This would be in cases where microfilariæ are "trapped" in lymph glands and allergic substances are liberated with the following allergic reactions. This would explain some more yet unexplained features in the T.P.E., e.g., in some cases high leucocytosis, in others more or less normal or only slight, different X-ray findings, nocturnal paroxysms, etc.

To prove or disprove these suggestions, further and more detailed laboratory and field work will be needed. As to the other points raised by Dr. McMillan:

1. It is wrong to say: ". . . but in such case the animal filarial parasite responsible for tropical pulmonary eosinophilia in New Guinea is unknown." It would be wiser to say that: ""The presence of animal filarial parasite responsible for T.P.E. in New Guinea has not been investigated."

2. Case V, as described in my paper, should be accepted as genuine, as it had all the accepted signs and symptoms of T.P.E., and this patient lived in an area where also few natives were seen suffering from filariasis. McMillan's statement that "no authentic record can be found of European contracting *Wuchereria bancrofti* infestation in the Territory of Papua and New Guinea" is true enough that, apparently, nobody has ever cared to put on record in a medical journal the fact that a European has suffered from filariasis. The reason for this is obvious: it adds nothing new and unusual to the filariasis problem whether the patient is a European or a native. However, the absence of records in the medical literature does not automatically mean the absence of the cases in the field. There have been at least some three cases in Rabual area where microfilariæ have been found in the peripheral blood-stream of Europeans, including one case with elephantiasis of a leg. Certainly, there are neither authentic records nor field observations that mosquitoes would have accepted discriminatory biting habits between the European and native inhabitants of New Guinea.

Yours, etc.,

Department of Public Health,
Goroka,
New Guinea.
February 9, 1959.

J. KARIKS.

WORK FOR THE HANDICAPPED.

SIR: Your leading article in the Journal of February 28, 1959, dealing with "Work for the Handicapped", is very timely. It touches on certain essential aspects of rehabilitation which many present-day enthusiasts in this field tend to overlook or give inadequate attention.

While rehabilitation of the disabled in its broadest sense is fundamentally the responsibility of the medical practitioner, too frequently is he only equipped, and indeed prepared, to treat the physical and psychosocial aspects of disability, giving lip service only to those aspects which, from the point of view of the handicapped and the community, are most important, and are collectively recognized as "resettlement". Chief of these, of course, is properly selected work for which the handicapped person has been thoroughly tested and found able, or has been well trained, to do, and which will ensure his economic security and independence. The aim should be to find these work opportunities in normal industry and commerce, and only as a last resort under so-called sheltered conditions in special workshops.

Until a planned effort is made in this country to overcome all problems impeding the employment of the disabled under normal conditions, it is difficult to assess the exact need for special workshops for the continual employment of those severely handicapped persons who may never be able to

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[1] *Brit. med. J.*, 1956, 1: 260.
[2] *Trans. roy. Soc. Trop. Med. Hyg.*, 1958, 52: 25.
[3] *East African med. J.*, 1958, 35: 493.

stand up to reasonable employment demands under normal conditions.

It is clear that practitioners who devote their skill to the rehabilitation of the disabled should be more than usually aware of community resettlement problems. They should be fully cognizant of techniques of prevocational evaluation, of work therapy and vocational training, of job analyses to indicate the physical and environmental demands of work, and of selective placement. There would appear to be a need, therefore, to bring more closely together the fields of physical medicine, occupational medicine and social medicine, so that practitioners will emerge better qualified to adequately supervise the rehabilitation of the disabled, more especially in what has been described as the "third phase" of medical care.

Until as a profession we recognize this need, and until there are enough of us qualified to assume our obvious responsibility in this matter, there is a danger that resettlement of the handicapped will remain uncoordinated and in the hands of well-intentioned but not always well-informed or qualified enthusiasts, with consequent inadequate results.

Your leading article also emphasizes another matter. Today throughout Australia, and more especially in the larger States, hospitals are giving increasing attention to rehabilitation. This, of course, is not before time, especially in the case of teaching hospitals. Many of these plans are based on the economic needs of the hospitals concerned—the need to return patients rapidly to their homes and to clear costly hospital beds. This, of course, is a very good economic argument for hospital rehabilitation. However, there is a risk here that the real task, which should be taken into full account from the initial stages of treatment—namely, complete community resettlement—may be overlooked or minimized. In other words, the disabled individual's personal needs may be overshadowed by the hospital planners' economic considerations.

Between some hospitals, too, there is evidence of a certain amount of parochial rivalry and criticism. This, of course, is also obvious between hospitals and other social welfare agencies, of both a statutory and voluntary nature, who are working for the handicapped. It is probably to be expected, and is the natural result of individual untempered enthusiasm. If we are sincere in our efforts for the disabled in our midst, we must plan and work on a cooperative basis. No one person, no one hospital, no one rehabilitation centre, no one agency can meet all the needs of all severely disabled people.

There must be coordination in planning and coordination in operation, if for no other reason but to ensure that highly trained and skilled medical and paramedical staff is deployed to the optimal advantage of our disabled citizens. In our work, too, could we think of these persons not as "patients", but rather as citizens of the community? By so doing, we are more likely to recognize and evaluate the problem they must face in returning to that community, and we will more ably advise and assist that community to receive them.

Yours, etc.,

G. G. BURNISTON,
Principal Medical Officer.

Department of Social Services,
Melbourne,
March 23, 1959.

TRAUMATIC RETROPERITONEAL HÆMORRHAGE.

SIR: At lunch on Monday, August 18, 1958, I read a letter to you written by Dr. S. V. Humphries, in which he reported an apparent case of traumatic retroperitoneal hæmorrhage, in the course of which he stated that he could not find any reference to a similar case in the available literature (MED. J. AUST., August 16, 1958).

The same evening, my house surgeon at the Adelaide Children's Hospital reported that a child of three had been admitted from Tennant Creek with a large abdominal mass. When I read the history, I said: "I have read this story before." Additional information from the mother showed that the child had remained well for six months, when, after another fall, the abdomen was noticed to be enlarged and hard. The abdomen had continued to increase in size, and on admission there was such gross enlargement that he walked like a pregnant woman at full term, and there was considerable dyspnœa. The mass was irregular in shape with quite a large knob in the hypogastric region, and there was a band of resonance crossing it which was thought to be due to the ascending colon. An intravenous pyelogram was done at once, and this showed the shadow of a large, solid tumour in the right side of the abdomen, no evidence of excretion of dye on this side, and a somewhat dilated but normally functioning kidney on the left side. Next day, under anæsthesia by Dr. W. D. Ackland-Horman, and with a blood transfusion running, the abdomen was opened by a right paramedian incision, with a pre-operative diagnosis of ? neuroblastoma or Wilms's tumour, with organizing hæmatoma or abscess as doubtful alternatives. On opening the abdomen, no deposits could be seen or felt in the liver; the mass was retroperitoneal, and the colon ran over its surface, the stretched-out appendix looking like ureter. After incising the peritoneum to the outer side of the colon, the mass was gradually dissected out. It was obvious to me that I would not be able to close the abdomen unless at least part of the mass were removed, and that the renal vein would not be able to be dealt with until a late stage of the operation. A piece of the tumour was cut out and Dr. M. C. Fowler did a frozen section, upon which he reported that the tissue was malignant. Fluid was sucked out of the cystic part of the mass, and old blood clot was observed here. Eventually the renal veins, ureter and renal artery were clamped, divided and tied with linen thread, the mass separated from the inferior vena cava and aorta and removed, although there was some unavoidable spilling of fragments of malignant tissue. The peritoneum was stitched back into place after providing drainage posteriorly, and the abdomen closed. He stood the operation, which took about two hours, very well; intravenous infusion was continued for the next 24 hours, and three days later X-ray therapy was commenced at the Royal Adelaide Hospital. The mass weighed nearly seven pounds. Dr. Fowler's report is appended:

> Macroscopically: Enormous tumour, weighing 2590 g., and measuring roughly 10" by 6" by 6". It is markedly lobulated with a vascular rough outer surface. In the middle part of one of the larger surfaces a kidney is easily recognizable. There is much hydronephrosis, but the ureter is still patent, although much compressed, and runs over the surface of the tumour. The kidney is not merely compressed by the tumour, but has been expanded by apparently intra-renal growth. The tumour tissue presents a very variegated appearance, being mainly fleshy pink tissue with much cystic change and hæmorrhage. Some of the blood containing cysts are up to several inches in diameter.
>
> Microscopically: A very poorly differentiated vascular, mitotically active malignant tumour. The cells have relatively little cytoplasm, and hyperchromatic round to oval nuclei. In some areas faint tendency to tubule formation is seen, and although the typical structure is not present the findings are consistent with the diagnosis of a nephroblastoma (Wilms's tumour).

I have reported this case, firstly because of the extraordinary coincidence mentioned at the beginning of this letter, and secondly because minor trauma is only likely to lead to retroperitoneal hæmorrhage if the kidney is damaged, or if a friable tumour is injured. Since operating upon this child, I have treated two with hæmatomata around the duodenum caused by more severe injuries. However, I cannot help feeling that if the posterior peritoneum had been opened at the first operation, the nephroblastoma might have been recognized then, because it must have been present at that time, since all the evidence points to such tumours being congenital in their origin.

This letter has been seen by Dr. Humphries, who is now in South Africa. I last saw the child a month ago, when he was in good health and no secondaries were evident, six months after the second operation; nevertheless I am not yet sanguine about the ultimate outcome.

Yours, etc.,

W. W. JOLLY.

49 Glen Osmond Road,
Eastwood,
South Australia.
March 18, 1959.

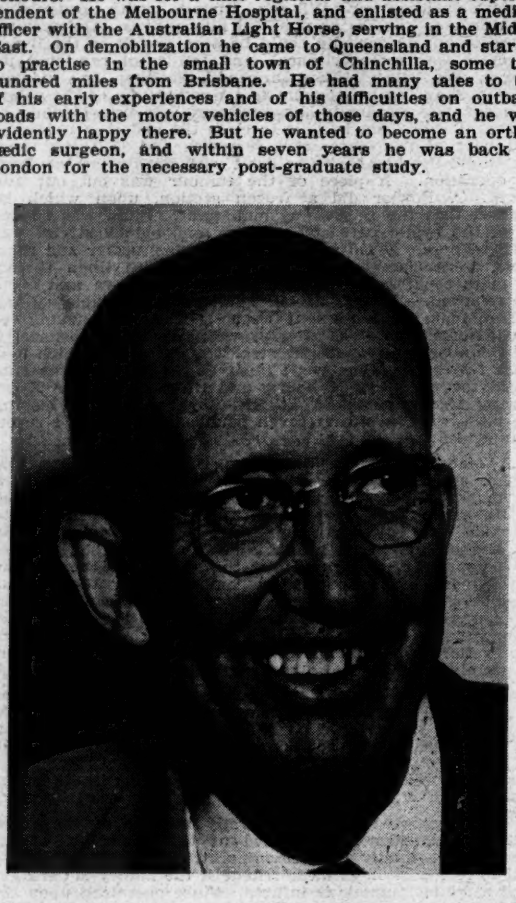
Obituary.

HAROLD CRAWFORD.

WE are indebted to Dr. Felix Arden for the following account of the career of the late Dr. Harold Crawford.

If ever a man learnt to "fill the unforgiving minute" it was Harold Crawford, whose varied achievements demon-

strated how much can be accomplished in a single lifetime, given the necessary determination and energy. He received his primary education at Doncaster State School, Victoria, and his secondary education at New College, Box Hill, finishing as *dux* of the school. He graduated in medicine from the University of Melbourne in March, 1915, with honours. He was for a time registrar and assistant superintendent of the Melbourne Hospital, and enlisted as a medical officer with the Australian Light Horse, serving in the Middle East. On demobilization he came to Queensland and started to practise in the small town of Chinchilla, some two hundred miles from Brisbane. He had many tales to tell of his early experiences and of his difficulties on outback roads with the motor vehicles of those days, and he was evidently happy there. But he wanted to become an orthopædic surgeon, and within seven years he was back in London for the necessary post-graduate study.



Returning to Queensland, Harold Crawford commenced specialist practice on Wickham Terrace, and secured appointments first as general surgeon (1928) and later as orthopædic surgeon (1929) to the Brisbane Hospital. He was appointed senior orthopædic surgeon to the Brisbane Children's Hospital in 1938. I first met him there in that year, discovering that he had already a reputation for patient, steady work. As an operator he was slow but meticulous, and his insistence that any job should be finished perfectly, however long it took, had earned him the neckname of "Atlas"—the man who held up the world. He favoured radical rather than conservative methods of treatment on those occasions when a choice could be taken, which made his operating sessions very long. He also expended an immense amount of time on his out-patient clinics and ward rounds, so that the orthopædic work of the Brisbane Children's Hospital (which he did single-handed) became one of its special features. Crawford's enthusiasm caused him to lay claim to all the fracture and osteomyelitis patients attending the hospital, which occasionally brought him into collision with his surgical colleagues. With all of this he managed to know his child patients as individuals, and they were devoted to him. He was appointed consultant orthopædic surgeon to the hospital in 1950.

Harold Crawford was shocked and indignant when the Hospital Board opened a ward for the treatment of poliomyelitis patients from the 1941 epidemic and put it under the care of Sister Elizabeth Kenny. For some time parents were actually asked whether they wished their children treated by "orthodox" or "Kenny" methods, and the choice was left to them. The conflict has died down now, but it was fierce for a time, and in Brisbane Harold Crawford was Sister Kenny's greatest adversary. These two strong personalities clashed whenever they met, each convinced that the other was doing irreparable harm to poliomyelitis sufferers.

Substantial though it was, his work at the Brisbane Children's Hospital took only a part of Crawford's time. He had a huge private practice in orthopædics, and could be found early and late at his rooms or at one of the suburban hospitals. In private life he was a family man, very fond of his home and garden, where he was in the habit of working for an hour or so in the early morning before starting the business of the day.

During the second World War, with the rank of major, he commanded the 101st Convalescent Depot, Queensland.

Harold Crawford has left his mark on Queensland in a number of ways. It was largely due to him that the degree and diploma courses in physiotherapy were established at the University of Queensland; for many years he was chief lecturer-in-charge. He was a member of the Australian Association of Physical Medicine, chairman of the Queensland Branch of the Australian Orthopædic Association and chairman of the Board of Studies in Physiotherapy and Occupational Medicine. He was lecturer in physical medicine in the Faculty of Medicine, lecturer in body mechanics in the Department of Physical Education, and a member of the Faculty of Medicine and of the Faculty of Science. He was the general power and organizer behind the scenes of the Spastic Children's Welfare League, which has done such spectacular work for spastic children in Brisbane during the past twenty years. He was at the time of his death chairman of trustees and chairman of the house committee. His name is perpetuated in the Crawford Wing of the Spastic Children's Centre at New Farm, built to accommodate country children as boarders. He was Australian representative on the World Commission on Cerebral Palsy, a member of the Standing Committee of the International Society of the Welfare of Cripples and Vice-President of the Executive Council of the Australian Advisory Council for the Welfare of Cripples. He was associated with the National Fitness Council from its inception in the 1940's and was its deputy chairman, and the National Fitness Movement throughout Queensland and especially the camp at Tallebudgera are lasting tributes to his work. But perhaps his most enduring monument will be St. Andrew's War Memorial Hospital. A staunch Presbyterian, Harold Crawford made an outstanding contribution to the medical and social service work of his church. St. Andrew's Hospital was essentially his idea, and as chairman of the Appeal Board, he was primarily responsible for its construction. Indeed, since his retirement from the Brisbane Children's Hospital a few years ago, St. Andrew's had occupied much of his time and thought—he was chairman of the Board of Governors. He had also been a member of the medical committee of the Queensland Bush Children's Health Scheme since 1938.

Enough has been said to indicate Crawford's determination and perpetual driving energy. Once he set his mind to a thing, he never gave up, and little by little, no matter what obstacles, it was done.

Some years ago he sustained a severe coronary attack. When he recovered, his friends expected that he would relax a little and potter in the garden. But once his heart had mended, he bought a place on the rich red soil of Buderim Mountain, eighty miles from Brisbane, and there he would spend his week-ends, but not resting. Proudly he would show you the stumps and rocks he had hauled out unaided, and the terraces he had constructed with mattock and shovel. The end came suddenly, as he must have wished, for a long period of inaction would have been hard for him to endure. He had the satisfaction of seeing his life rounded off—the award of the O.B.E. for his medical and social service work, his daughters (one a nurse, two science graduates) married, his two sons graduated in medicine, his beloved St. Andrew's Hospital recently opened—and with this he was well content.

DR. DONALD WATSON writes: Harold Crawford was a man of frail physique, and in the later years of his life he was dogged by ill health. If at times he looked as though he had the cares of the world on his shoulders, that may have been because that was just where a great part of them were, or so it seemed to anyone who studied his many interests. Besides his hospital appointments, he was an elder of his church, chief lecturer in charge of the Department of Physiotherapy and Occupational Therapy, guiding spirit of the Spastic Children's Welfare League, chairman of the St. Andrew's War Memorial Hospital Appeals Committee, and a member of the National Fitness Council; for years he was the B.M.A. representative on the council of the Royal Flying

Doctor Service, on the council of the Lady Gowrie Child Centre and on the Queensland Bush Children's Health Scheme, and on great numbers of subcommittees arising from these. He was for 16 years on the council of Emmanuel College, University of Queensland. On top of all this he had a large practice composed of extraordinarily devoted patients.

This is not the place to catalogue his virtues, but it would be fair to state that his greatest attributes were courage and tenacity and a keen eye for a worthy cause. Armed with these and an apparently inexhaustible energy, he has left behind him an astonishing list of achievements. The School of Physiotherapy and Occupational Therapy and the excellent and thriving Spastic Children's Centre are very largely the results of his efforts. Recently he had the pleasure of seeing the St. Andrew's War Memorial Hospital opened, and those aware of his part in its building will know that without his urging it probably would not have been opened at all, and if it had, would have been an indifferent establishment instead of the excellent hospital it is. He lived to see all these projects completed, and his devoted family, two of whom are doctors, well established. He was honoured for his efforts by the award of the O.B.E. by Her Majesty the Queen. He deserved well of the community, and those who attended his funeral would realize that the community clearly recognized its debt.

JOHN JOSEPH HOLLAND.

We are indebted to Dr. B. C. Cohen for the following account of the career of the late Dr. John Joseph Holland.

With the passing of J. J. Holland on January 4, 1959, Western Australia lost an outstanding personality. He was born at Windsor, N.S.W., on February 11, 1876, and attended the Parish School and then St. Joseph's College as a boarder from 1887 till 1894. He entered St. John's College, University of Sydney, as the Norbert Quirk Scholar in Classics, it being at that time incumbent on undergraduates to hold an arts foundation before commencing medicine.

In 1895 he had perforce to leave college for financial reasons. In the bank smash his father, with many others, lost practically everything, and Joe refused to become a further burden on the family. However, as an "outpatient" he continued his studies and qualified soon after the turn of the century. He was a house surgeon at St. Vincent's Hospital and Prince Henry Hospital at a salary of 10s. per week. From there he went to Lewisham Hospital. As he whimsically said, he was the first and last house surgeon at Lewisham, at least for a very long time.

It was in 1896 that he was the first "case" of appendicectomy operated on by Alexander McCormick.

He came to Western Australia in 1907, and commenced practice at Kanowna, then a flourishing goldfields town, but now nearly obliterated in a desert of sand. After three years he left the goldfields for the great southern agricultural town of Katanning. In 1914 he came to Perth, agreeing to look after Dr. Deakin's practice whilst that doctor was at the war, and after Dr. Deakin's return to Sydney in 1917, Holland continued on with his surgery in the A.M.P. Buildings until his retirement in 1946.

Whilst house surgeon in Sydney, Holland came in contact with some famous characters. Henry Lawson was a patient in Prince Henry Hospital, and was attended by young Dr. Holland and nurse Alicia Simmonds, who was to become Mrs. Holland in 1906. He was on friendly terms with Banjo Patterson, the art of speech instructor Victor Daly, and Douglas Mawson. He knew John Haynes and Archibald, who were instrumental in founding *The Bulletin*.

In 1915 Holland became an honorary out-patient surgeon of the Perth Public Hospital and later honorary gynæcologist. He retired as consulting gynæcologist in 1939. He said that his interest in women's diseases was aroused at the early age of 10, at Windsor, when a woman descended from a dray and proceeded to give birth to an infant. He sent his mates for help and stayed to assist her. It disproved the bird and bee theory for him, but he felt that it must have started him on his gynæcological career.

Amongst his many interests, music played a prominent part. He was no mean exponent on the piano, and in the early days when his daughters Judy and Eleanor brought Eileen Joyce home from the Loreto Convent, he often played duets with her. He was a member of the Council of the Western Australia Society of Concert Artists, which produced a dozen operas, and he helped to found the Green Room Club for persons interested in music.

Holland was a great lover of horses. He was president of the Katanning Polo Club and later owned gallopers and pacers which met with moderate success. His black and lilac colours saluted the judge many times on his best mare Rainaway. He was the honorary surgeon to the Western Australia Turf Club and the Western Australia Trotting Association for about forty years. He was a member of various clubs in Perth, and at least on one occasion won the billiard tournament at Tattersall's Club.

He will always be remembered for his great efforts in furthering the work of the St. John Ambulance Association. In the movement he has become almost a legendary figure. In 1914 he joined the St. John Council, and was its president for eighteen years. Under his guidance the movement flourished, and it was mainly due to his efforts that we have the beautiful building for our headquarters which is regarded as one of the best centres of its kind in Australia, if not in the world. In 1924 he became officer of the order, and in 1930 he was invested as a Commander by King George V in London. On that occasion Mr. Ghandi was present. In 1934 he became a Knight of Grace, and was the personal medical attendant to the Duke of Gloucester on his visit to Western Australia and South Australia.

In 1937 he was invited to a seat in Westminster Abbey to witness the coronation of King George VI.

In 1952 Holland received the C.B.E. for the invaluable work he had done for the Ambulance Services in Western Australia. His interest in this work dated back to his Kanowna days. One of his pupils in first aid was a postal official named Tuckett. In 1917 Tuckett was the postmaster at Hall's Creek. A man, James Darcey, fell from his horse, and was brought in a distance of 40 miles over extremely bad country by his brothers. Darcey's condition was critical. He had severe pelvic injuries and retention of urine. It would have taken a week to get him to the nearest doctor at Wyndham, and of course, he could not have survived. Then was enacted the epic

case of treatment by telegraph. Wires were sent back and forth between Tuckett and Holland several times a day, each wire (the first of 279 words) costing about £40. There were pages of them, at a total cost of about £600. Holland instructed Tucket how to perform first of all a perineal and later a suprapubic cystostomy. There was immediate relief; but it was arranged that Dr. Holland and a nurse should go up, as Darcey's condition was precarious. The 2000 mile journey in those days presented many difficulties. Because of regulations, Dr. Holland had to sign on as a cattleman on the S.S. *Moira*. From Derby he set out for Hall's Creek with Jack Haly, and after a nightmare journey, partly by car, partly by horses, through terrible country and crocodile-infested creeks, they reached their goal. Twenty miles from Moolaboola natives brought word that Darcey's condition was deteriorating. They drove their "T" model Ford all through the night at top speed in order to maintain the lights. (It was the first time a car had been driven at night in the Kimberleys.) They arrived at Hall's Creek to find that Darcey had died three hours previously. A post-mortem examination disclosed that the operations had been skilfully performed, there was no sepsis, no peritonitis and the kidneys were normal. There was a very large spleen and it appeared that the patient had succumbed to a very severe malarial attack, starting two days previously.

When Dr. Holland returned to Perth he was met on the railway station by Doctor John Flynn. He recounted his adventures, and said: "The next time I go to Hall's Creek, I'll fly." "Good idea", said Flynn. It was at that moment that the seed of the Royal Flying Doctor Service for our north-west was planted, and we all know how it has borne fruit. Dr. Holland was one of the founders of this service, and always took an active interest in it.

In British Medical Association affairs he was a grand worker. He was a councillor for many years, and president of the Western Australian Branch in 1929. He was a prime mover in the formation of the Medical Benevolent Scheme, and a founder of the Medical Defence Association of Western Australia.

In the formation of the Medical School he took a keen interest. He worked very hard to have the Anatomy School established here. His colleagues, Dr. H. J. Gray and Dr. L. E. LeSouef, worked with him to have the *Anatomy Act* passed in 1936, and together they carried out the first preservations and dissections.

He sold his practice to Dr. Aberdeen in 1946, but remained very active, playing bowls and carrying out part-time medical work for the Repatriation Department and the Government up to within a few months of his death. His wife predeceased him, and he leaves two sons and two daughters.

Goodbye, Joseph Holland; yours was a full and useful life and you will be remembered for your good work by your patients, the people and the profession.

Royal Australasian College of Surgeons.

PRIMARY EXAMINATION FOR THE F.R.A.C.S.

A PRIMARY EXAMINATION in anatomy (including normal histology) and applied physiology and the principles of pathology will be conducted in Melbourne, Sydney and Dunedin in September, 1959.

The written papers will be held simultaneously in the three centres on Thursday and Friday, September 3 and 4, 1959. The examiners will visit the three centres for the purpose of conducting the viva-voce sections of the examination.

The examination is reciprocal with the primary examination for fellowship of the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, and the Royal College of Surgeons in Ireland, or the primary examination in surgery of the Royal Faculty of Physicians and Surgeons of Glasgow and the College of Physicians, Surgeons and Gynæcologists of South Africa.

Each examination is open to graduates of not less than one year's standing of a medical school approved by the Council of the College for the purpose.

Candidates must submit evidence of their qualifications and date of acquirement thereof.

Forms of application for admission to the examination may be obtained from the Examination Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, Victoria.

When entering for the examination candidates must state whether they desire to appear before the Board of Examiners in Melbourne, Sydney or Dunedin.

The fee for admission or readmission to the examination is, in the case of the examination held in Melbourne and Sydney, £26 5s. (*plus* exchange on cheques drawn on banks outside Melbourne). The fee for the examination held in New Zealand is £26 5s., New Zealand currency, and should be remitted by bank draft drawn on Melbourne in favour of the Royal Australasian College of Surgeons. The fee must be forwarded with the form of application so as to reach the Examination Secretary at his office in Melbourne not later than July 23, 1959.

It is stressed that entries close at the College office in Melbourne on July 23, 1959, and that late entries cannot be accepted.

FACULTY OF ANÆSTHETISTS: PRIMARY EXAMINATION.

A PRIMARY EXAMINATION for the F.F.A., R.A.C.S., in anatomy, physiology, pharmacology and pathology will be conducted in Melbourne, Sydney and Dunedin in September, 1959.

The written papers will be held simultaneously in the three centres on Thursday and Friday, September 3 and 4, 1959. The examiners will visit the three centres for the purpose of conducting the viva-voce sections of the examination.

Each examination is open to graduates of not less than one year's standing of a medical school approved by the Council of the College for the purpose.

Candidates must submit evidence of their qualifications and date of acquirement thereof.

Forms of application for admission to the examination may be obtained from the Examining Secretary, Faculty of Anæsthetists, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, Victoria.

When entering for the examination, candidates must state whether they desire to appear before the Board of Examiners in Melbourne, Sydney or Dunedin.

The fee for admission or readmission to the examination is, in the case of the examination held in Melbourne and Sydney, £26 5s. (*plus* exchange on cheques drawn on banks outside Melbourne). The fee for the examination held in New Zealand is £26 5s., New Zealand currency, and should be remitted by bank draft drawn on Melbourne in favour of the Royal Australasian College of Surgeons Trust Account. The fee must be forwarded with the form of application so as to reach the Examination Secretary at his office in Melbourne not later than July 23, 1959.

It is stressed that entries close at the Faculty office in Melbourne on July 23, 1959, and that late entries cannot be accepted.

ALAN NEWTON PRIZE.

In 1951 the sum of £1042 was subscribed to provide a prize to recognize the services to the Royal Australasian College of Surgeons of Sir Hibbert Alan Stephen Newton, Kt., a foundation Fellow and, later, a president of the College. This sum of money has been invested in authorized trustee investments, and the interest used to provide a prize for essays on practical surgical subjects. The prize is to be awarded under the following conditions:

1. The Alan Newton Prize shall be awarded biennially.

2. Candidates for the prize shall be Fellows of the Royal Australasian College of Surgeons (not being members of the Council), the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, Fellows in Surgery of the Royal Faculty of Physicians and Surgeons of Glasgow, or Fellows in Surgery of the College of Physicians, Surgeons and Gynæcologists of South Africa.

3. Essays must be typewritten in English and not to exceed 75,000 words. Case histories of cited cases must not

be included in the typescript, but placed after it in an appendix.

4. Each essay must be distinguished by a motto and accompanied by a sealed envelope containing the name and address of the author and having on the outside of the envelope the motto corresponding to that on the essay.

5. Essays must reach the Secretary on or before December 1 in the appropriate year.

6. The prize essay and accompanying illustrations and preparations will become the property of the College.

7. Authors may claim essays not awarded prizes upon authenticated application within two years.

8. If no essay is adjudged worthy of the prize, no award shall be made.

9. Any unexpended interest may be added to the principal of the fund.

The subject for the next essay is "The Pathology and Surgery of Hernias of the Abdominal Wall". All entries must be in the hands of the Secretary of the College on or before December 1, 1960.

FACULTY OF ANÆSTHETISTS: PRIMARY FELLOWSHIP EXAMINATION.

At the primary fellowship examination of the Faculty of Anæsthetists of the Royal Australasian College of Surgeons held in March, 1959, the following candidates satisfied the Board of Examiners and were approved: Holland, R. B.; Lane, J. E. D.; O'Donnell, J. E.; Stocks, J. G.

PRIMARY FELLOWSHIP EXAMINATION.

At the primary fellowship examination of the Royal Australasian College of Surgeons held in March, 1959, the following candidates satisfied the Board of Examiners and were approved: Berkley, R. M.; Cumming, W. J.; Fuller, K. M.; Gibson, G. R.; McKessar, J. H.; O'Brien, M. F.; Schneider, C. H.; Syme, G. A.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Course in Anæsthetics for General Practitioners.

The Post-Graduate Committee in Medicine in the University of Sydney announces that a course in Anæsthetics for general practitioners will be conducted by the department of anæsthetics and resuscitation at the Sydney Hospital for two weeks, from November 16 to 27, 1959. The course will be a full-time one, from 9 a.m. to 6 p.m. daily, consisting of practical demonstrations and tutorials. Enrolments will be limited to four, and applicants should submit particulars of their anæsthetic experience and requirements. It is regretted that, for the present, this course is open only to applicants from New South Wales. The closing date for applications is June 30, 1959, and the selection of candidates will be announced shortly after this date.

The fee for attendance is £12 12s., payable after selection date. Application should be made on the prescribed form, which is available from the Committee on request, and forwarded to the Course Secretary, the Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 4497-8. Telegraphic Address: "Postgrad Sydney."

COURSE IN MEDICINE AT ST. VINCENT'S HOSPITAL, MELBOURNE.

The Honorary Medical Staff of St. Vincent's Hospital, Melbourne, will conduct a post-graduate course in medicine,

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MARCH 14, 1959.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	..	..	..	..	..	..	..	1
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	1	..	..	..	..	..	7	..	8
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	11(7)	20(19)	2(1)	..	..	1	..	1	35
Diphtheria	..	..	..	..	..	..	..	..	..
Dysentery (Bacillary)	..	6	1	..	..	..	3	..	10
Encephalitis	..	1	..	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	3	..	..	3
Infective Hepatitis	57(17)	37(13)	10(4)	11(4)	1(1)	..	2	..	118
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	1	..	..	..	1	..	2
Leptospirosis	..	..	5	..	..	..	..	..	5
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	..	1(1)	..	..	..	1(1)	..	..	2
Ophthalmia	..	..	..	..	4	..	..	..	4
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	14(11)	..	1(1)	2(1)	1	..	..	18
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	8(3)	20(12)	..	..	..	..	..	..	28
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	3(1)	..	..	..	..	..	3
Trachoma	..	..	..	..	2	..	26	..	28
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	25(18)	22(16)	6(3)	4(3)	11(6)	5(2)	3	..	76
Typhoid Fever	..	1(1)	..	..	..	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

suitable for candidates studying for the degree of M.D. (Melbourne) and the M.R.A.C.P. diploma. This course will run for six weeks from June 1 to July 11, 1959. Sessions will be held from Mondays to Fridays at noon, 2.15 p.m. and 3.45 p.m., finishing at 5 p.m., and on Saturdays at 9.30 a.m. The course will consist of lectures, case presentations and ward rounds, with special demonstrations in radiology, neurology, electrocardiography, medical ophthalmology, pathology, dermatology, biochemistry, etc.

During the course, Dr. R. Farquharson, Professor of Medicine, University of Toronto, will be in Melbourne and will visit St. Vincent's Hospital.

Enrolments, together with the fee of £31 10s., should be sent to the Melbourne Medical Post-Graduate Committee, 394 Albert Street, East Melbourne, by May 15, 1959.

THE POST-GRADUATE MEDICAL FOUNDATION OF THE UNIVERSITY OF SYDNEY.

THE following is a list of donations so far received by the Post-Graduate Medical Foundation of the University of Sydney.

General.

Burroughs Wellcome & Co. (Aust.) Ltd.[1], The Upjohn Company (Aust.) Pty. Ltd.[1], Roche Products Pty. Ltd.[1], each £1500: £4500; Washington H. Soul Pattinson & Co., Mr. R. R. Coote[1], Colgate Palmolive Pty. Ltd.[1], each £500: £1500; F. H. Faulding & Co. Ltd., Sandoz Australia Pty. Ltd.[1], The British Drug Houses[1], Charles McDonald Pty. Ltd.[1], Kodak (Australia) Pty. Ltd., Edward Lumley & Sons (N.S.W.) Pty. Ltd.[1], George Patterson Pty. Ltd.[1], each £250: £1750; G.P. Pty. Ltd., Truth & Sportsman Ltd., Wilh. Wilhelmsen Agency Pty. Ltd.[1], Whale Industries Pty. Ltd.[1], each £200: £800; Essex Laboratories Ltd., J. Bayley & Sons Limited, Caltex Oil (Australia) Pty. Ltd., Gowing Bros. Ltd., The Lorna Hodgkinson Sunshine Homes, Mr. Allan Williams, Mr. J. O. Johnsen, Australian Cream Tartar Co. Pty. Ltd.[1], McPherson's Limited, each £100: £900; Miss N. Morrice, £30; Pharmedica Pty. Ltd., £52 10s.: A. & R. Co. Pty. Ltd., E. E. Fortescue, Mr. Mark Foy, each £25: £75; Peter Marich & Co.[1], Mr. Roy Miller, J. H. Liddle & Epstein Pty. Ltd., Joy Manufacturing Co. Pty. Ltd., Sebels (Aust.) Ltd., Tanner Middleton Pty. Ltd., Townson & Mercer, Mr. L. McEachern, each £10 10s.: £84; Gartrell White Limited, F. T. S. O'Connell, Griffin & Co. Pty. Ltd., each £10: £20; Bridgland Brown Pty. Ltd., Consolidated Metal Products, Osti Knitting Industries Pty. Ltd., Tanner Middleton Pty. Ltd., Walter A. Cox Pty. Ltd., each £5 5s.: £26 5s; A. F. Bambach Pty. Ltd., £5; L. Robinson, £4; Boyd Lane & Co. Pty. Ltd., Levine Pty. Ltd., J. Herbert Yates Kid Co. Pty. Ltd., each £2 2s: £6 6s.; Boyce Brothers, Laurence G. Harrison, Parker Bonderite Pty. Limited, each £1 1s.: £3 3s.

Members of the Medical Profession.

Dr. George Bell, £250; Dr. R. B. C. Stevenson, £100; Dr. Cotter Harvey, Dr. H. N. Merrington, each £26 5s.: £52 10s.; Dr. H. Maynard Rennie, £25; Dr. J. D. Russell, Dr. S. E. L. Stening, Dr. J. H. D. Edwards, each £10 10s.: £31 10s.; Dr. G. A. M. Heydon, £10; Dr. V. M. Coppleson[1], £21; Dr. W. G. Simmons[1], Dr. G. B. S. Roden, Dr. Neville Stewart, Dr. John Huxtable, Dr. D. N. Short, Dr. Clifton Waker, Dr. L. T. Robey, Dr. B. L. Menzies, Dr. R. Winton[1], Dr. S. H. O'Reilly, each £5 5s.: £52 10s.; Dr. A. H. Macintosh, Dr. J. McKell, Dr. F. H. Mills, The Hon. Sir Norman Kater, Dr. Allen Muscio, each £5: £25; Dr. J. G. Richards, Dr. Sydney George, Dr. R. W. Tinsley, Dr. Douglas Vann, Dr. B. McKay Rush, Dr. K. G. Vincent[1], Dr. M. Andrew, each £3 3s.: £22 1s.; Anonymous, Dr. M. N. Tinckam, Dr. M. A. Schalit, Dr. R. T. C. Hughes, Dr. M. S. Malcolm, Dr. S. J. Rush, Dr. E. K. Parry, Dr. K. G. Outhred, Dr. W. P. and Dr. S. Nelson[1], each £2 2s.: £18 18s.; Dr. G. E. Sanders, Dr. Ralph Reader, Dr. S. G. Stefan, each £2: £6; Dr. B. C. Terrey, Dr. F. G. Masters, Dr. J. B. Phillips, Dr. J. Tonkin[1], each £1 1s.: £4 4s.; Dr. J. T. O'Neill, Dr. D. S. Thomson, each £1: £2.

Totals.

Previously acknowledged, £9936 15s. (annual contributions, £4850). Total received to date £20,313 14s.

[1] Annual contribution.

Medical Appointments.

Dr. G. C. T. Kenny has been appointed Senior Lecturer in Anatomy in the University of Melbourne.

Deaths.

THE following death has been announced:

THELANDER.—Charles August Thelander, on April 4, 1959, at Brisbane, Queensland.

Diary for the Month.

APRIL 18.—Victorian Branch, B.M.A.: Country Branch Meeting (Warrnambool).
APRIL 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
APRIL 22.—Victorian Branch, B.M.A.: Branch Council.
APRIL 23.—New South Wales Branch, B.M.A.: Clinical Meeting.
APRIL 24.—Queensland Branch, B.M.A.: Council Meeting.
APRIL 28.—New South Wales Branch, B.M.A.: Hospitals Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales. Anti-Tuberculosis Association of New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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